GAS JOURNAL

LIGHT ∴ HEAT ∴ POWER

BY-PRODUCTS.

Founded in 1849 as the "Journal of Gas Lighting."

VOL. CCXIV.

APRIL TO JUNE, 1936.

LONDON:

WALTER KING, LTD.,

11, BOLT COURT, FLEET STREET, E.C. 4.

1936.

Gas Journal

APRIL 1, 1936

Vol. 214 88th Year No. 3802

Editorial Notes

Progress at Plymouth

THE technical management and maintenance of our works must not be allowed to overshadow the equally necessary activities of other departments, whose services should be adequately recognized and rewarded. With this concluding note of the Presidential Address of Mr. R. J. H. Clark, Engineer to the Plymouth and Stonehouse Gas Light and Coke Company, at last Friday's meeting of the Southern Association of Gas Engineers and Managers we are in complete agreement. The "levelling-up" process of manufacture and sales has yet, however, a long way to go before we can feel at all satisfied. And, as Mr. Clark says, a belief in the future prosperity of our Industry is not in itself sufficient. Our policy should aim at the highest efficiency in each department, with the team spirit pervading the whole.

Mr. Clark's well-balanced Address is indicative of an undertaking pursuing a well-balanced policy in regard to the attention paid to the various phases of its activities, and it may be described as an outline of the direction in which these activities are going. The works, distribution, and sales sides are dealt with in proper proportion, and it is this proportioned attitude which has placed the Plymouth Company in the sound position it occupies to-day in an area where electrical competition is of the keenest. Manufacturing plant and distribution system are efficient and up-to-date in all respects as a result of steady and continuous modernization. On the works there is the full complement of plant for naphthalene washing, benzole recovery, and gas drying. The distribution system, with its main mileage extended by more than one half during the past twelve years, ensures an ample supply at all points of the area. Nothing has been neglected in the way of giving good service and building up a live, enthusiastic selling force. Of all departments, that devoted to selling has, in fact, seen the greatest change during recent years. The sales department is under the charge of a "man of sound technical training and invested with wide authority." It is pleasant to read a sentence like this in an Address given by an Engineer.

Complacency out of Place

IT is interesting to see what the Plymouth Company is doing in face of formidable competition from the Corporation-owned electricity undertaking whose works are among those selected to run from the Central Electricity Board's Grid. At showrooms situated in the best shopping thoroughfare in the City, a permanent lady demonstrator, at least twice weekly, shows the public what gas cookery means, and the public's interest never flags. A staff of canvassers is permanently employed, reinforced each summer by selected fitters. A travelling showroom aids sales both within the City and in the outer areas, as also does a scale of charges which has proved far better than the old flat rate. "We are convinced," says Mr. Clark, "that it was the means not only of securing fresh business, but of maintaining some that we previously ran the risk of losing." We would also mention the Company's action in rapidly replacing old black cookers by high-grade all-enamel models. The outlook which Mr. Clark takes on the cooking load is the right one. He compares the number of gas cookers on the area with the exceedingly small number of electric cookers, and explains that, of the latter, already over 10% have been replaced by gas cookers. But, he observes, "however satisfactory from our point of view this comparison may be, we are more conscious than ever that no effort on our part must be spared to maintain, if not improve, the position we now hold." Mr. Clark is not at all complacent about this position, and in this connection we would call attention to that section of his Address under the sub-heading of "Gas *versus* Electric Cooking."

Need for Skilled Fitters

WE would refer to one point in regard to the district and to one relating to both works and district. The first is the concern shown by Mr. Clark that the supply of trained gasfitters is not equal to demand. This problem was also discussed by Colonel Eunson in his Presidential Address to the Midland Association of Gas Engineers and Managers, and was commented on in these columns a fortnight ago. In common with the Northampton Gaslight Company, the Plymouth Company offers practical encouragement to the keen man and takes an active interest in his progress in the educational courses which have been arranged. The lack of supply of properly trained fitters—and only first-class fitters can satisfactorily install and maintain modern high-class gas appliances—is certainly a pressing problem; and it is up to individual gas undertakings to do all possible to ensure the supply of well trained, efficient personnel. The other point is a works problem which affects the district—the elusive problem of gum formation. At Plymouth, after the combined dehydration, naphthalene removal, and benzole recovery plants had been in operation for some time, gum troubles made their appearance on the works, and on the district in the shape of choked by-passes and

stuck thermostatic valves. The virtual end to the troubles was, in Mr. Clark's words, " finally brought about with almost ludicrous ease." The gas oil which had been in use for naphthalene removal and benzole recovery for nearly two years showed signs of sludging, and it was decided completely to renew it. With the introduction of the fresh oil came a sharp abatement of the gum troubles on the district, and within a couple of months they virtually disappeared. It will now be the practice at Plymouth to change the oil at shorter intervals or when signs of polymerization occur. Mr. Clark, realizing the complexity of the subject and the conflicting experiences, does not offer this as a panacea for all gum troubles; but as a record of what happened at the works of the Plymouth and Stonehouse Gas Company it is certain to arouse interest.

Selling Coke

THOUGH for obvious reasons much of the preliminary work must take place behind the scenes, and consequently receives little of the light of publicity, it is good news that schemes are being actively discussed for the formation of coke associations in several districts. Reference was made to the subject, for example, at the recent meeting of the Midland Association, and Colonel Carr, speaking as a visitor in his capacity of President of the Institution, ventured a remark that they in the Midlands might not perhaps feel coke oven competition quite so keenly as do Yorkshire and Lancashire. This remark was greeted by the Midlanders with what the reporters commonly describe as " cries of oh," of such vehemence as to leave no doubt at all as to the difficulty of such competition in their area.

We have emphasized before in these columns that competition difficulties can be solved by the formation of coke associations. Proof lies in the record of the London and Counties Coke Association. It has been in operation for little over four years, starting its work on the sure foundation laid by the London Coke Committee; and in this short period its various activities have quite transformed the outlook on coke sales of its members and indeed of the whole Industry. The Association can claim to have greatly enhanced the reputation of coke as a fuel in the eyes of both the technical user and the domestic customer. It has brought about a system of co-ordination and regulation of price which works smoothly and successfully; and everything points to the need for setting-up district organizations. The view has been expressed that extension of the London and Counties Coke Association to cover the country might well become unwieldy and fail in its detailed operation. On the other hand, district associations could be co-ordinated through one centre, and the London Association has given full assurance that all help possible will be given to any district aiming at such a formation. In our opinion affiliation of the district associations to the London and Counties Association should be regarded as an essential part of the scheme. The experience of the " parent body " would obviously be of great value.

Those who are suffering from competition from coke oven coke and price cutting should bear in mind that there is plenty of business to go round. The time has passed for the gas and coke oven industries to work independently of one another in the selling of solid smokeless fuel, and selling organizations should cover the coke ovens as well as the Gas Industry. The coke oven industry is doing itself harm in selling individually instead of adopting the proved advantageous policy of co-operation and co-ordination. We mention again, however, that the strength of any district organization must depend on the efforts made by each individual undertaking. Each undertaking must do its utmost to sell more coke in its district, and the idea that coke sales will interfere with the selling of gas must go by the board. Because of this idea—fortunately not generally held to-day—many salesmen are endeavouring to increase coke sales with their hands tied.

Refrigeration Boom

ONE of the spectacular features of 1935 was the refrigeration campaign organized by the Gas Light and Coke Company. This met with such success that the public demand for gas-operated refrigerators almost immediately outstripped the supply, and the Company had perforce to cease campaigning. In nine weeks the number of refrigerators installed on the Company's area jumped from 600 to 7,000, and during the year 9,500 were sold. The success provided a pointer to the future policy of Electrolux, Ltd., the makers of gas refrigerators, who decided that, to meet the enormous demand confidently anticipated, they would cease manufacture of electric models, greatly extend their factories, and concentrate solely on those run by gas. The public are being informed of this decision by advertisements appearing in the National Press and issued jointly by thirty-eight gas companies—an excellent example of co-operative advertising. In the announcement it is mentioned that one company supplies New York with both its gas and its electricity, and that its experience has led it to recommend and sell only gas refrigerators.

That 1936 is going to see a boom in gas refrigeration, we have no doubt, and it should be country-wide, for last year the demand was by no means confined to the area of the Gas Light and Coke Company. The factors of silence, low maintenance cost, and economy in operating are all strong selling points in favour of refrigeration by gas. The refrigerator is, however, a comparatively expensive piece of apparatus, and the load will not be sold unless the public are offered easy purchase terms over a period. It was the Gas Light and Coke Company's offer in 1935 to install refrigerators for half-a-crown a week, this including a five-years' guarantee—the purchase period—and free fixing and maintenance, which led to the ready response of the public and the dismay of the electricians. Also, we shall have competition to face. An indication of this was given at the general meeting last week of the County of London Electric Supply Company, which with its associated companies is operating over some 3,000 square miles in the South of England. The Chairman announced that the Company is laying itself out to install a large number of refrigerators and is offering an " excellent refrigerator " at a hire-purchase charge of half-a-crown a week. The Gas Industry must see to it that the consumer's half-crown for refrigeration is spent to the best advantage. For refrigeration, gas has none of the drawbacks of electricity, and it is cheaper. It is only a question of getting in first—a question of more than ordinary importance, however, when five-year hire-purchase agreements are the basis of refrigerator sales.

Rising Costs

AT the end of last year, when we were discussing the probability—now become a fact—of an increase in coal prices to the Gas Industry, we took occasion to call attention to the serious trend of costs in other directions also. The " GAS JOURNAL " can justly claim, without doing so in any spirit of " I-told-you-so," to have pointed out on various occasions in the slump years the golden opportunity which existed for gas undertakings to modernize or renew their manufacturing plant at a cost which was

not likely to be offering for ever. In cases where this was not feasible for any reason, whether financial or otherwise, or was not favoured through lack of confidence, and where replacement has now become urgent through obsolescence, or enlargement through increasing demand, the plant makers to-day are faced with the difficulty of unknown quantities in raw material and labour costs, both of which have for some time now shown a strongly rising tendency.

On the utilization appliance side the same grave difficulties were forcefully emphasized by Mr. H. James Yates in his speech at the Radiation meeting last week. In reviewing the year's working, he pointed out that " costs have shown a general increase. We have had to meet certain increases in wages and pay higher prices for our raw materials; we have embodied in our goods further improvements and developments which have added to the cost of manufacture, but our selling prices have not been increased. This year we are again faced with increases in wages, and, in addition, a further increase in the cost of our raw materials."

What applies to Radiation Ltd. in this respect applies, of course, to the suppliers of all the apparatus which the Gas Industry requires for the consumption of its products, and, since apparatus is the essential of gas sales, a condition of rising costs in this direction must be regarded by the Industry with a seriousness little less than rising costs of gas manufacture when they occur. The bright side of the picture is the almost universal report of increased, and increasing, demands for new and up-to-date appliances, and it is clear from Mr. Yates' speech that it is principally this factor which has enabled the Radiation group to carry on its policy of continuous improvement of its goods without raising selling prices. At the same time it cannot be regarded as entirely satisfactory from the Gas Industry's point of view that so important a section of itself as the domestic appliance makers should have to report that profits have not responded proportionately to increased turnover, however satisfying a record turnover may be in other ways.

There are two features of Radiation work, inter-dependent to a large degree, which the Gas Industry desires above all to see perpetuated—research, in which they are acknowledged pioneers, and on which, as Mr. Yates emphasized, annual expenditure amounts to a very substantial figure, and the resultant frequent incorporation of new and improved features in their appliances. Bearing in mind the services rendered in these respects alone, the Industry will be ready to give a sympathetic hearing to the difficulties which Mr. Yates voiced at the meeting, and to appreciate that it is in its own interest to give all possible support to the appliance makers in meeting the problems which confront them from time to time. Gas undertakings need appliances at as low a cost as is consistent with high quality; we fear, however, there is too often a tendency to take the easy way and to try to sell on price instead of on quality. There is, moreover, always the risk of gas undertakings losing sight of the fact that a gas appliance is designed primarily to sell gas, and of regarding it as a means of producing a big profit on its initial side.

The Gas Unit

A MATTER to which Mr. Yates referred with lively satisfaction is the growing popularity of the gas unit of 4,000 B.Th.U. As is well known, Radiation were the first to advocate the adoption of this small unit, which renders comparison with the electrical unit of 3,412 B.Th.U. simple and direct. The green booklet bearing the title " How to Employ the Gas Unit " which the firm published five years ago set out an admirably clear case for the adoption of the 4,000 B.Th.U. unit, and has proved of great help to a large body of gas salesmen in explaining to consumers the running costs of gas appliances. It was in 1931 also that the National Gas Council Committee on Charges, in conjunction with The Institution of Gas Engineers, discussed the question and came to the conclusion that the 4,000 unit was the best size for undertakings to adopt. The Gas Industry has a reputation for moving slowly, but since that time—more noticeably of late—several progressive gas undertakings, small and large, have adopted this unit in the belief that it is an important asset to the salesman. Among them is the South Metropolitan Gas Company, who announced this decision in November last—as we said at the time, " a very authoritative pronouncement in favour of the adoption of a unit for the convenience of consumers and to facilitate comparison with the cost of other forms of fuel and energy."

Not the least interesting feature of the pronouncement was the fact that it was in favour of 4,000 B.Th.U., and it can be definitely stated that consensus of opinion has vindicated the view which Mr. Yates advocated from the beginning that the gas unit should be of this size, and not of 3,412 B.Th.U. Not only the South Metropolitan, but all other undertakings which have recently adopted a unit at all, have accepted this value for it.

Forthcoming Engagements

April.

2.—MIDLAND JUNIOR ASSOCIATION.—Meeting. Paper by Mr. F. J. Bengough.
3.—B.C.G.A.—Annual Meeting of Gas Salesmen, Caxton Hall, S.W. 1.
3.—NORTH BRITISH ASSOCIATION.—Spring Meeting at Glasgow.
4.—MANCHESTER AND DISTRICT JUNIOR ASSOCIATION.—Annual Dinner. Paper by Mr. J. A. Speers.
4.—SCOTTISH EASTERN JUNIOR ASSOCIATION.—Meeting at Hawick.
6.—I.G.E.—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m; Benevolent Fund Committee of Management, 4.30 p.m.
6.—B.G.F.—Exhibitions Committee Meeting, 28, Grosvenor Gardens, S.W. 1, 12 noon.
7.—I.G.E.—Council Meeting, 10 a.m.
7.—N.G.C.—Central Executive Board Meeting, 2.30 p.m.
7.—N.G.C.—National Joint Industrial Council at 3 p.m.
[*Meeting of Central Executive Board Cancelled.*]
8.—B.C.G.A.—Annual Meeting of Members in Scotland; North British Station Hotel, Edinburgh, 2.15 p.m.; preceded by Meeting of Committee for Scotland, 11 a.m.
16.—S.B.G.I.—Council Meeting at 2.30 p.m.
18.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting.
18.—WESTERN JUNIOR ASSOCIATION.—Meeting at Plymouth. Presidential Address of Mr. J. H. Dyde.
18.—WALES AND MONMOUTHSHIRE JUNIOR ASSOCIATION.—Annual General Meeting at Caldicot.
21.—I.G.E.—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.
23.—I.G.E.—Joint Lighting Committee, 2.30 p.m.
24.—N.G.C.—Annual Meeting of Members in Scotland at Central Station Hotel, Glasgow, at 2.30 p.m.

May.

1.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
1.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Annual Business Meeting.
5.—I.G.E.—Research Executive Committee, 2.30 p.m.
8.—NORTH OF ENGLAND G.M.A.—Annual Meeting at Newcastle and Lecture by Prof. J. W. Cobb, C.B.E.
6-7.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring Meeting at Lincoln.

PERSONAL

Mr. A. BRADFORD LEGG, Secretary of the Bilston Gas Light and Coke Company, completed fifty years' service with the Company on March 26.

* * *

After 45 years' service with the British Gas Light Company, Ltd., Mr. E. A. SAINSBURY, of Trowbridge, Engineer and Manager of the Trowbridge, Bradford-on-Avon, and Warminster Undertakings, has sent in his resignation on account of ill-health. This has been accepted by the Directors who have expressed their appreciation of Mr. Sainsbury's services during this long period and have placed him on the retired list.

His successor is Mr. J. V. KNIGHT, of King's Lynn, who takes up his duties to-day.

Mr. Sainsbury was born at the Trowbridge Gas Station where his father was Manager, and commenced his service with the Company in 1890. In 1903 he was promoted Manager and transferred to Holywell, where he remained until 1920. During that period he was presented with a silver goblet by the Directors in recognition of 25 years' faithful service. In 1920 he returned to his native town as Manager.

* * *

We learn that Mr. H. A. WRIGHT has been appointed Managing Director of the Rotherham and District Collieries Association, Ltd.

* * *

The Severn Valley Gas Corporation, Ltd., have appointed Mr. J. HERBERT CANNING, Jnr., A.M.Inst.Gas E., to the position of Manager and Secretary of the Welshpool Lighting and Power Company. Mr. Canning was formerly Technical Assistant to the Newport (Mon.) Gas Company.

* * *

Mr. F. S. HUNTER, Engineer and Manager of the Ormskirk District Gas Company, has taken up the position of Engineer and Secretary to the Bridlington Gas Company, which, like the Ormskirk Company, is one of the Companies controlled by the British Gas Light Company. Mr. Hunter has been presented by the Directors of the Ormskirk Company with a Crown Derby coffee service and a Tuscan china tea service. He also received an easy chair from the staff and workmen.

* * *

Mr. NORMAN CLAYTON, of the Wallasey Gas and Water Departments, has been appointed to the post of Technical and Engineering Assistant to the Accrington District Gas and Water Undertakings.

Mr. Clayton was educated at the Central School, New Brighton, and in 1930 commenced an engineering apprenticeship and training at the Gas and Water Works of the County Borough of Wallasey, after which he completed his technical training in the laboratories and drawing offices of the engineering staff. During the past two years Mr. Clayton has been Junior Technical Assistant. He is the son of a senior and valued official of the Wallasey Gas and Water Department.

* * *

At the annual meeting of the Peterhead Public Bowling Club the resignation from the position of Secretary of Mr. WILLIAM RITCHIE was announced. Many deserved tributes were paid to the good services of Mr. Ritchie, who demitted office "so that the honours might go round." He is well known to the Gas Industry as Engineer, Manager, and Secretary of the Peterhead Gas Department.

* * *

Mr. JOHN LUPTON, who for many years was Engineer and Manager of the Windermere Gas and Water Undertakings, has been returned unopposed as a Councillor for the Urban District of Windermere.

* * *

On the occasion of his leaving Perth to take up an appointment as Distribution Engineer with the Preston Gas Company, Mr. T. M. DUNCAN, Assoc.M.Inst.Gas E., was presented by the staff of the Corporation Gas Department at the Friarton Workshops with a parting gift in the form of an ornamental clock and two framed etchings of Perthshire scenery.

A Broughty Ferry man, Mr. Duncan received his early training at Dundee Gas-Works, and went to Perth as Technical Assistant to the Gas Manager in 1926, and after qualifying as a Gas Engineer he was elected an Associate Member of The Institution of Gas Engineers. For the past eight years he has been lecturer in Gas Engineering and Supply at Dundee Technical College.

In making the presentation, Mr. David Vass, Engineer and Manager, spoke of the interest Mr. Duncan had taken in improving the training of the staff. Mr. Duncan thanked the staff for their help and co-operation in all matters, and for their kindly token of esteem and best wishes on parting.

OBITUARY

The death took place on March 27 at the age of 72 of Mr. FREDERICK SMALLBONE, who, until his retirement in 1929, was Engineer and Manager of the Waltham and Cheshunt Gas Company.

About 1890, Mr. Smallbone was appointed Engineer and Manager of the Hoddesdon Gas Company. In 1898 he received a similar position with the Chigwell, Loughton, and Woodford Gas Company, leaving for Cromer where he took up duty, again as Engineer and Manager, in 1912. From 1915 until 1919, when he was appointed to Waltham and Cheshunt, he was Works Manager to the Brighton, Hove, and Worthing Gas Company. At the time of his death, among many other public services, he was fulfilling his duties as Chairman of the Health Committee of the Cheshunt U.D.C.

* * *

We regret to announce the death at the age of 91 of Mr. CHARLES HUSSEY, J.P., who, until his resignation in January, had been a Director of the Croydon Gas Company for over 45 years.

He led a very energetic life and until a few weeks ago he was still actively engaged in business. He was the last of the 44 magistrates appointed when Croydon was granted its commission of peace in 1885, and was, therefore, a Justice of the Peace in four reigns.

* * *

The death occurred in an Edinburgh nursing home on March 29 of Mr. WILLIAM G. READDIE, an ex-Provost of Anstruther, at the age of 68. A native of Leven, he was appointed Secretary and Manager of Anstruther and Cellardyke Gas Company, Ltd., in 1892, retiring when the Company became amalgamated with St. Andrews Gas Company at the end of last year. He was a member of the Town Council for 33 years, and was Provost for four terms. In 1932 he retired from the Provostship of Anstruther Easter, Anstruther Wester, and Kilrenny.

* * *

Many of our readers will have seen the announcement in yesterday's *Times* of the death of Mr. THOMAS ANTHONY VANDER WILLIGEN on March 27 at Antwerp. Mr. Vander Willigen, M.E., who was in his 70th year, was a Director of Messrs. Humphreys & Glasgow, Ltd., and while primarily interested in the firm's work on the Continent, where he was particularly well-known to engineers in Belgium and Holland, he also had many friends in this country. He had been connected with Messrs. Humphreys & Glasgow for about forty years. The funeral took place at Brussels yesterday.

1936 "JOURNAL" DIRECTORY

Page 4. AUDLEY. W. E. Stephenson, E. & M., resigned.

Page 22. EAST DEREHAM. W. E. Stephenson appointed E. & M. vice H. Kitson, retired.

Page 30. HAMPTON WICK. C. T. Price appointed G.M.

Page 32. HAYLING ISLAND. C. E. Hutchins appointed E. & M. vice E. E. J. Cornish.

Page 32. HEBDEN BRIDGE. L. S. Pickles appointed E. & M. vice T. H. Nield, retired.

Page 36. KEIGHLEY. A. Bromley, E. & M., retired.

News in Brief

An Alteration of Declared Calorific Value is announced by the Chertsey Gas Consumers' Company. On and after July 1 they will supply gas of 500 B.Th.U. per cu.ft.

Applications are Invited for the position of Assistant Gas Engineer to the Perth Corporation Gas Department. The appointment carries a commencing salary of £350, rising by annual increments of £25 to £400.

A Change of Address is announced by the Chemical Engineering Group of the Society of Chemical Industry who have now moved to 56, Victoria Street, London, S.W. 1. Telephone Number: Victoria 1410.

An Application for a Special Order is intended to be made to the Board of Trade under the Gas Regulation Acts, 1920 to 1934, by the Newport (I.o.W.) Gas Company with the object *inter alia* of acquiring certain lands for gas-making purposes.

Electricity Failed Several Times last week during a meeting of the Poynton Council. The Council was obliged to rely on the light provided by several candles. The only public lights in the town which were illuminated were two lighted by gas in Fountain Square. Traffic lights also failed.

Much to the Amusement of those assembled for the Annual Dinner of the Cheltenham and District Gas Company (and, we gather, the entertainment was not altogether unappreciated!) there was a complete failure of the electricity supply throughout the town for about two minutes.

A Declaration of Calorific Value is announced by the Portsmouth and Gosport Gas Company inasmuch as they intend to supply on and after July 1, 1936, gas of 450 B.Th.U. per cu.ft. in the Borough of Gosport and certain parishes in the urban and rural districts of Fareham and the rural district of Droxford.

Application for an Order under Section 1. of the Gas Undertakings Act, 1929, is intended to be made to the Board of Trade by the Eastbourne Gas Company with the object *inter alia* of raising £60,000 further additional capital by the creation and issue of ordinary and preference stock or by either of these modes.

Among the Exhibitors at the Grand Trades Exhibition held at the Winter Gardens, Morecambe, under the auspices of the Morecambe and District Chamber of Trade from March 18 to 25, were the Morecambe and Heysham Corporation Gas Department, who are, by the way, opening new showrooms shortly in Morecambe Street.

Sanction Has Been Received by the Plymouth Corporation Gas Committee from the Ministry of Health for the borrowing of £10,000 for the extension of the carbonizing plant at the Devonport Gas-Works. The output of gas for the month of February shows an increase of 5·59% as compared with the output in the corresponding month of 1935.

A Good Film "**Link-Up**" was the result of co-operation between the Birkenhead Gas Department and the management of the Scala Kinema, Birkenhead, in connection with the presentation of the film "Music Hath Charms." The Department permitted the use of their showroom window for the exhibition of an illustrated panel, measuring 10 ft. by 2 ft., with tinsel wording reading "Music Hath Charms and Increased Charm for Both Player and Listener when a Gas Fire is used to Heat the Room." In return for this publicity, the picture theatre management arranged for the exhibition of gas fires, floor standards, and table lamps in the lobby of the theatre.

A Sliding Scale of Charges based on consumption is under consideration by the Southport Corporation Gas Committee. The suggested scale is: The first 4,000 cu.ft., 3s. 3d. per 1,000 cu.ft.; next 6,000 cu.ft., 3s. per 1,000 cu.ft.; next 10,000 cu.ft., 2s. 9d. per 1,000 cu.ft.; and graded down to 1s. 3d. per 1,000 cu.ft. The rates are subject to a discount of 5% for prompt payment, and to apply to all consumers except the Corporation Departments which have special terms for central heating, which will not be affected. The ordinary charge for gas at the present time is 3s. 3d. per 1,000 cu.ft., but there is no charge for the meter. The suggestion is that the proposals should come into effect from June to all consumers.

"**Gas Equipment in Private Hotels**" is among the latest publications by the British Commercial Gas Association. With the approach of the holiday season this attractive booklet should meet with a very warm reception from the many thousands of private hotel proprietors and managers who are closely concerned with the comfort of their guests.

For the Month of February the report of the Aberdeen Gas Department shows an increase of 15,910,000 cu.ft. in the month's output, the total being 175,382,000 cu.ft., as against 159,472,000 cu.ft. a year ago. Coal carbonized, amounting to 10,948 tons, showed an increase of 556 tons, while coke sold, although 110 tons less, produced £127 more revenue. Tar products and ammoniacal liquor also produced £280 more revenue.

An Increase in the Price of Gas for ordinary lighting and domestic use of 2d. per 1,000 cu.ft. is recommended by the Birkenhead Gas Committee. Ordinary lighting or domestic use, present charges, per 1,000 cu.ft., 2s. 10d.; per therm, 5d. The proposed new charges are 3s. and 8d. In the out-townships, ordinary lighting for domestic use will be increased from 3s. 3·4d. per 1,000 cu.ft. to 3s. 5·4d., or from 8·75d. per therm to 9·2d. per therm.

A Series of Gas Cookery Demonstrations and exhibition held by the Bridport Gas Company proved successful in every respect. The cake-baking competition attracted nearly a hundred entries. After distributing the prizes in the presence of a crowded audience, Mr. W. H. Reed, Engineer, Manager, and Secretary of the Company, tendered a very hearty vote of thanks to the demonstrator, Miss M. C. Hawkins, who, assisted by Mr. E. R. George, judged the entries. Mr. R. Mabb, the Company's Chief Clerk, commented upon the success of the exhibition and complimented Miss Hawkins upon her skill as a demonstrator.

Amalgamation and Grouping

Mossley and Saddleworth Gas Company: New Agreement.

It will be recalled that in our issue for Jan. 29, last, it was stated that although fifteen months had elapsed since an agreement had been entered into with the Mossley Corporation by the Mossley and Saddleworth Gas Company for the sale of the Mossley Corporation Gas-Works, the sale had not yet been confirmed by the Board of Trade.

We are now informed that on Saturday, March 28, by sixteen votes to two, the Mossley Town Council confirmed a new agreement for the sale of the Corporation Gas-Works to the Mossley and Saddleworth Gas Company, Ltd., whose registered office is at 15, Moorgate, London. Under the new agreement the Company will pay to the Corporation, on the date of transfer, probably on Oct. 1, next, a sum of £208,361. The Mossley Corporation Gas-Works, which are among the most modern in the country, were built at a cost of approximately £145,000, and were opened by Lord Derby on June 22, 1931. Due principally to a slump in the commercial load by the closing of cotton mills, losses have been sustained. The Council also became committed by the Ministry of Health to the repayment of a temporary loan of £41,836 in 12 years. This would have meant the levying of a special rate varying from 2s. 5d. down to 1s. in the £ during the next 12 years, and it was felt that the town, in its present position, could not bear this heavy burden. The consideration for the transfer to the Company of the Gas Undertaking shall be the payment in cash by the Company to the Corporation on the date of transfer of the following sums:

(*a*) The sum of £208,361.

(*b*) A sum equal to the aggregate amount of all sums transferred during the period after March 31, 1935, and before the date of transfer from the General Rate Fund of the Corporation to make good revenue deficiencies of the Gas Undertaking.

(*c*) All such (if any) sums as may become payable by the Company to the Corporation under the provisions of Clause 8 (which refers to maintaining the Gas-Works in a proper and efficient condition from the date of agreement to the date of transfer, &c.), and all such (if any) further sums as would have become payable by the Company to the Corporation under the provisions of this clause if the date of this Agreement had been March 31, 1935.

In regard to the price of gas, the Special Order provides

for a basic price of 11·14d. per therm in Mossley with an additional two-fifths of a penny per therm outside the Borough. A basic dividend of 5% per annum on the ordinary capital of the Company is also provided for. The Corporation agree to enter into a contract with the Company to take gas for the entire public lighting of the Borough for a period of not less than five years from the date of transfer.

Improved Lighting at Alloa

Needs of Modern Traffic Met

Alloa Corporation Lighting Department are now completing a notable example of improved street lighting by high-power gas lamps from Clackmannan Road to Gaberston Park.

The new system meets the needs of modern traffic conditions. The installation complies with the recommendations contained in the Interim Report of the Departmental Committee on Street Lighting. The new installation consists of 15 Sugg's high-power gas lamps with 8 mantles, mounted on steel columns at the height of 18 ft. Each lamp is fitted with directional reflectors which double the amount of luminosity from the burners and provide an equal distribution of light on the roadway. The illuminating effect of each lamp is equal to about 700 candles, compared with 120 candles from the old lamps displaced.

Successful Wallasey Exhibition

Hotel Catering Demonstrations

There were large attendances at the gas service exhibition and cookery demonstrations arranged by Messrs. Radiation, Ltd., in co-operation with the Wallasey Gas Department, held last week at the St. James' Church Hall, Victoria Road, New Brighton, which again proves the popularity of gas for cooking, heating, hot water supplies, and lighting.

Striking improvements in the efficiency of gas appliances were in evidence. Of particular interest was the "Wallasey" all-enamel gas cooker which is available to all consumers on attractive hire-purchase terms, no deposit being required. Other cookers in beautiful coloured enamel finishes and fitted with automatic ignition were on view. The Misses Jacques and Hawkins, capable lecturesses trained at the Radiation Research Kitchens, gave interesting and instructive demonstrations at each session. Gas fires of the newest designs and in a variety of delightful coloured finishes were also exhibited. Special fires in coloured finishes are available on terms of simple hire at 2s. per quarter. In the water heating section there were appliances for every purpose, all finished in white enamel.

Messrs. W. H. Dean & Sons exhibited their new gas washing machines. These well-designed machines, in attractive all-enamel finishes and fitted with efficient wringers, were demonstrated during each session.

An especially interesting feature of the exhibition was the display of hotel catering equipment, and on Wednesday afternoon a demonstration of the use of these appliances was given. This was attended by the local Association of Caterers, Hotel and Boarding House Owners, &c., and proved to be a very popular event. In welcoming the Association, Mr. H. B. Holliday, Engineer and Manager of the Borough Gas and Water Department, called attention to the various features of the gas appliances.

It is interesting to note that the hospitals, hotels, and nursing homes in Wallasey use gas exclusively for cooking, while the schools are heated by means of large gas-fired boilers, the room temperatures being thermostatically controlled.

A remarkable display of the compressed gas equipment for homes which are outside the reach of the ordinary mains' supply was shown in use. The installation comprises two cylinders, each containing 150 cu.ft. of gas, and a specially designed pressure reducing governor connected to a "Wallasey" cooker, a gas fire, and lighting fittings.

The interior of the hall was illuminated by means of modern gas fittings with switch controls.

Gas Favoured in Council Houses

Devon Gas Association's Success

The Bradninch and Cullompton Housing Committee has recommended that permission be given for the installation of gas for lighting Council houses. The Devon Gas Association, who offered to pipe the houses for lighting at their own expense, had on two previous occasions been refused permission to carry out the work.

The Committee now recognize that the Gas Company has given every facility with regard to heating and cooking, and consider that competition is desirable in the matter of domestic lighting.

In support of the recommendation it was suggested that the Council should not allow a monopoly to be established in their houses. It was hard lines that the Gas Company, having extended their mains, should not have equal facilities to those of the Electricity Company.

The recommendation was carried by 12 votes to five.

Illuminating Engineers Burn the Midnight Oil

I.E.S. Annual Dinner and Dance

The Annual Dinner and Dance of the Illuminating Engineering Society, held at the Trocadero Restaurant on Tuesday, March 24, certainly lived up to its name as being one of the most enjoyable functions of the year. A greatly increased attendance, this year totalling over 340, bore ample testimony both to the success of this event in previous years and to the universal esteem in which the President, Mr. A. W. Beuttell, M.I.E.E., is held by lighting engineers.

The Loyal Toast having been honoured, on the call of the President, Mr. J. M. Kennedy, O.B.E., M.Inst.C.E., M.I.E.E., President of the Institution of Electrical Engineers, proposed "The Illuminating Engineering Society."

Responding to the toast, the President, Mr. A. W. Beuttell, said that it had been very nice indeed to hear Mr. Kennedy speak as he had done of the work of their Society and his appreciation of its magnitude and its character. It was more than a pleasure to have Mr. Kennedy and Col. Carr at their annual dinner, because they represented the industries which were the parents of the Society, and there was nothing that the Society desired more than to keep in the closest touch with the industries which provided them with their raw materials—gas and electricity. The membership of the Society had increased materially, and he referred to the new photometric and architectural sections that had been formed in the Society. The President also called attention to the good services of their Secretary, Mr. J. S. Dow.

Mr. A. Cunnington, B.Sc., M.I.E.E., Vice-President, I.E.S., proposed "The Guests," and referred to the fact that the Society had to rely upon the gas and electricity industries for their progress, and it was therefore with great pleasure that he welcomed, among others, Col. Carr, O.B.E., T.D., President of The Institution of Gas Engineers, and Mr. A. Maurice Bell, A.M.Inst.Gas E., President of the Association of Public Lighting Engineers.

Col. W. M. Carr, responding to the toast, wondered what exactly was his relationship with the Society whose guest he was that night. He really believed that he was also a member! But he was none the less honoured in replying to the toast. On the question of his relationship with the Society he admitted that he was on the maternal side, for the Gas Industry was really the mother of advanced lighting, but he granted the paternity to Mr. Kennedy! But, he continued, they united together in the Society in common interest which was better marked. They still required a better standard of lighting throughout the land. There were far too many local authorities who were satisfied with lamps which were erected over forty years ago. It was that common objective of improved lighting which brought the gas and electricity interests together in the Society. Mr. Kennedy had taken upon himself the responsibility of proposing the toast of the Society for both the Gas and Electricity Interests, and had referred to the fact that he had recently been studying the history of gas. Well, he would say that he had also been into the history of gas public lighting, and he called their attention to the Board of Trade Returns—the Government was always accurate!—which stated that the amount of gas used by public authorities for public lighting in 1920 was 6,000 million cu.ft., while in 1934 this figure had grown to 12,640 million cu.ft. Competition had, he suggested, been perhaps too much to the advantage of local authorities, and he pointed out amid laughter that the Research Depart-

ment of the Society might well concern itself with that problem. He concluded by saying that he was grateful to Mr. Beuttell and to the Illuminating Engineering Society for permitting him to be a guest that night, and permitting him to reply on behalf of the guests.

Mr. A. Maurice Bell also replied to the toast. He referred to the happy relations which existed between the Illuminating Engineers and the Public Lighting Engineers. He welcomed the President's remarks that his Association were to expect an even closer friendship with the Illuminating Engineering Society, and while the Illuminating Engineering Society dealt with every field of illumination and his Association dealt only with public lighting, they worked together in the closest harmony and co-operation. In conclusion he congratulated Mr. Beuttell on the progress that had been made by the Society during his year of office.

An "Off-the-Floor" Gas Cooker

Interesting New Appliance by Sidney Flavel

Passing reference is made in our account of the exhibits at the *Daily Mail* Ideal Home Exhibition on other pages of this issue to an interesting departure by Sidney Flavel & Co., Ltd.—namely, the "Elf" gas cooker.

The "Elf" has been produced to meet competition from the electrical industry, for a certain class of consumer, which has been felt all over the country, and particularly in South London; so that while the cooker makes its first public appearance at the Ideal Home Exhibition, it is not "untried," as it has been produced in collaboration with the South Metropolitan Gas Company, who have approved the cooker for use in their area of supply. We understand that an invitation has been received by the makers to submit a model to Watson House.

As our illustration shows, the cooker is so designed that it may be hung on the wall on a special supporting bracket. Being thus independent of the usual stand, the "Elf" saves valuable floor space. The cooker is stated not to cause discoloration of the paintwork when hung on the wall by reason of the fact that the surplus heat is conducted to the front through the plate-warming chambers on either side of the oven. These chambers have withdrawable plate-holders and will properly warm six dinner plates at a time. The oven is insulated and porcelain enamelled inside throughout, with a white panel in the door. The overall dimensions of the cooker are 18 in. wide by 13 in. deep, with a height at front of 20 in. and 25½ in. at the back. The oven is 11 in. wide by 11 in. high by 13 in. deep and the warming chambers 13 in. by 11 in. by 2 in.

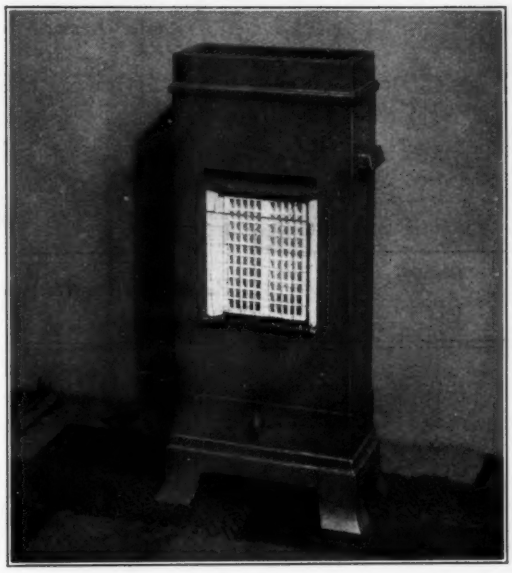
The Flavel "Elf" has been designed on entirely new lines and is the expression of to-day's need for a full capacity, small and compact cooking unit at an economic price for the flat or kitchenette. The "Elf" is stated to cook for a family of four—two adults and two children.

A New Convector-Radiator

Bratt Colbran's "Mortimer" Heater

Another interesting new gas appliance introduced to the public at the *Daily Mail* Ideal Home Exhibition, and referred to briefly in our account of the exhibits at Olympia, is Bratt Colbran's "Mortimer" heater.

The firm have, of course, for some while past been making a small convection radiator; but they have been quick to see the added advantages of the radiation-*plus*-convection appliance. The result has been the production of the "Mortimer" heater—similar in general line to its predecessor, but incorporating a radiant surface in addition.



The "Mortimer" Heater, 2-Unit Size.

The "Mortimer" heater is a portable unit and can be plugged in or connected to the gas supply wherever required. It is of sufficiently light construction to be moved from one room to another if desired, but probably its widest application is for heating the hall, where owing to the presence of draughts and the absence of a flue it is not possible to use an open fire.

It is supplied in 1-unit and 2-unit sizes, and either one or both of the radiants in the 2-unit model may be lighted at will. The gas supply is governed to a low pressure, the consumption being 10 cu.ft. per hour for each radiant unit.

In design the "Mortimer" heater is simple and well suited to the modern style of furnishing. It is finished in a choice of the following "Lustral" colours: Rush green, apple green, black, beige, gold, silver, bronze, maroon, cream, royal blue, and saxe blue.

The heaters are supplied complete with dress guards.

Redditch Ladies' Gas Circle

Talk by W. E. Benton

A very enjoyable and instructive afternoon was spent at the showrooms of the Redditch Gas Company by eighty members of the Redditch Ladies' Gas Circle on Thursday, March 19.

It was the occasion of a talk given by Mr. W. E. Benton, B.Sc., Research Chemist of Cannon Iron Foundries, who, among other items of interest concerning gas cookers, showed the functioning of an automatic oven heat control, as fixed on cookers supplied by the Company, and used by the majority of the members present. A cordial vote of thanks was given by Mr. C. Wright, who expressed appreciation on behalf of the members, for the most instructive talk given by Mr. Benton.

Tea was served by the Company's demonstrator, Miss C. P. Hill, and the meeting concluded with a discussion by the members, on the syllabus of the forthcoming cookery demonstrations.

Western Junior Gas Association

Visit to Cheltenham

An excellent attendance of members of the Western Junior Gas Association assembled at Cheltenham on March 21 in response to an invitation to inspect the works of the Cheltenham and District Gas Company. The party were welcomed on behalf of the Directors by Mr. L. E. Twycross.

After the inspection tea was provided at the Queen's Hotel through the courtesy of the Directors of the Company, to whom a vote of thanks was moved by the PRESIDENT (Mr. J. H. Dyde, of Plymouth), supported by the SENIOR VICE-PRESIDENT (Mr. S. B. Jones, of Clevedon).

Replying, Mr. A. L. MORRIS (Commercial Manager and Accountant) said it had been a great pleasure to have so large a gathering that afternoon, and he would have pleasure in conveying the thanks to his Directors.

Members then made their way to the Technical College, St. Margaret's Road, where a Paper was read by Mr. J. H. Smith, of Stewarts & Lloyds, Ltd., on "The Manufacture, Testing, and Protection of Steel Pipes for Gas Distribution." An abstract of this Paper is published on later pages of to-day's "JOURNAL."

Members of the Western Junior Gas Association at Cheltenham.

Coal Tar Products

Export and Import Figures

The total value of finished dye-stuffs obtained from coal tar imported into the United Kingdom during February was £125,686, compared with £68,104 in February, 1935. The corresponding quantities exported were 4,462 cwt. and 2,575 cwt.

The value of coal tar products exported in February was as follows: Coal tar, £26,050 (£20,026 in February, 1935); coal tar pitch, £84,176 (£93,440); tar oil, creosote oil, anthracene oil, and other heavy coal tar oils, &c., £54,037 (£33,406). The total quantities exported were: Coal tar, 10,301 tons (9,112 tons in February, 1935); coal tar pitch, 43,087 tons (36,677 tons); tar oil, creosote oil, anthracene oil, and other heavy coal tar oils, &c., 2,013,849 gallons (1,460,575 gallons).

In February the value of sulphate of ammonia exported was £87,530 compared with £146,479 in February, 1935. The quantity exported was 14,537 tons (25,504 tons in February, 1935), of which 3,008 tons went to the Irish Free State, 3,604 tons to British India, 400 tons to Ceylon, 50 tons to Hong Kong, 5,572 to other British countries, 10 tons to Portugal, 1,303 tons to the Canary Islands, 201 tons to Japan, and 389 tons to other foreign countries.

Exhibition and Demonstrations at Londonderry

Cake-Baking Competitions

The Londonderry Gas Light Company met with great success at their recent exhibition of modern gas appliances and cookery demonstrations held for a fortnight in the Melville Hotel recently.

The Company fitted up a model bathroom, and displayed the latest "Radiation" gas fires and cookers. The total attendance for the nine days exceeded 3,000 persons, the majority of these attending the cookery demonstrations. These were given by Miss M. Lee-Booker, of the Radiation Research Kitchen, and a variety of interesting dishes was cooked, including cakes for Easter, savouries, omelettes, soda bread, &c. Of great interest to the audience were the complete dinners cooked in the "New World" oven without attention.

A further attraction was the cake-baking competition with prize awards and a large number of entries was received. As a result of this splendid effort by the Londonderry Gas Light Company they were successful in selling large numbers of gas cookers and ranges, gas fires, gas water heaters, and gas hotel equipment.

New Showrooms at Dundee

"Live" Hot Water Display

The opening ceremony of Dundee Corporation Gas Department's new showrooms in Commercial Street was performed by Miss B. K. Loggie, daughter of the Convener of the Gas Department, Mr. R. Loggie, who presided. At a luncheon which followed, Mr. Loggie said that they were carrying out a big reconstruction scheme at the gasworks in order to meet the greatly increasing demand for gas. For the present year to date an increase of 30 million cu.ft. in the amount of gas made had been registered, and there was every prospect of the year being a record one.

Mr. J. C. Walker, Secretary of the B.C.G.A., said that the showroom should be regarded as part and parcel of the sales policy of the Gas Department, a place where the public could be induced to call, not necessarily to buy, but to learn of all the modern improvements and developments in the application of gas for domestic purposes.

The new showrooms comprise two handsomely appointed sections, one for the display of gas fires, &c., and the other for kitchen equipment. The former section is panelled with gas fires, the lay-out being a great advantage in that a fire can be selected to suit whatever style of decoration has been chosen for a room.

The other section is given to gas cookers, refrigerators, washing machines, and other appliances for culinary and domestic use. A bath and hot water basin have also been fitted to display water heaters. In this section there are six large rooflights which cast a soft glow over the exhibits and the cream and leaf green walls.

The premises have two large floodlighted windows, the lighting being provided by three troughs each with 16 mantles.

Athletic and Social

Wellington Annual Staff Dinner.

The annual staff dinner of the Wellington (Salop) Gas Company took place last week, when about 76 sat down to dinner under the chairmanship of Mr. R. J. Milbourne (Chairman of Directors).

A pleasant evening was spent, during the course of which Messrs. J. Stock, H. Davies, H. Rowley, H. Jarvis, and A. Jarvis were presented with medals on completion of 20 years' service with the Company.

Exhibition Celebrates a Hundred Years of Gas at Ely

The Exhibition Hall at Ely.

In connection with the centenary of the Ely Gas and Electricity Company, it was the desire of the management to organize something different from the usual humdrum affairs. The Hall of the local Women's Institute was therefore engaged, and with the co-operation of the B.C.G.A. an excellent exhibition was arranged.

The *pièce de résistance* was the B.C.G.A.'s model kitchen, containing kitchen furniture in Jubilee blue and silver. Over the all-metal sink was fixed an Ascot multi-point water heater. Parkinson's R.A. cooker in Jubilee blue, an Electrolux refrigerator, a Jubilee washing machine, and a drying cabinet completed the equipment. All the appliances were connected and working.

Adjoining the model kitchen was a model bathroom. The best bath with black marble sides that could be obtained locally was installed, and the hot tap connected through to the Ascot. The hot tap of the pedestal hand-basin was also connected to the Ascot heater, but over this hand-basin was also fixed the National S.S. sink water heater. The latest clinical lamp (disc type), an "Equator" heater, and a chromium-plated towel rail completed the bathroom.

Great care was taken in the selection of the lighting units and seven different lamps were used in this section. Altogether the stand was well lighted. The Webson switch, controlling one or more than one light was demonstrated in the bathroom.

On the other side was presented a model drawing-room, containing a fire and surround from the showrooms of Bratt Colbran, Ltd. The lighting consisted of a 3-piece pendant, bracket to match, standard lamp and table lamp, all by Falk Stadelmann & Co. The furniture was loaned by a local firm.

Other displays included "Newpark" and "New World" cookers in colour finishes, while one of Bratt Colbran's new panel radiators was fixed over the door, and, immediately beneath it, a "Dekorlyte" sign. Special displays supplied by the makers were shown of "Newpark" cookers and "Newscreen" fires, these displays being floodlighted with Falk's 3-light parabolic reflector burners.

A Kempton's coke fire was fitted into a surround (supplied locally) and the latest panel fires, radiators, and other appliances were shown.

Throughout, lighting received most careful consideration. A lighting display grouped together many kinds of lamps, fittings, and shades. Daylight and ordinary mantles were contrasted. In addition, different lighting units were arranged round the hall or on the stage.

On the stage, above which was fitted a gas-illuminated clock, a demonstrator from the Parkinson Stove Co. cooked in "Newpark" cookers, and a test meter marked in pence was prominently displayed.

Opening Ceremony.

Mrs. James A. de Rothschild wife of the member for the Isle of Ely—opened the Exhibition. Canon C. E. Raven (Regius Professor of Divinity at Cambridge University), a well-known figure locally and nationally, acted as Chairman.

The Ely Company endeavoured to encourage sales by offering Centenary gifts; but it is their opinion that this effort did little to affect the sales. Those people who wanted appliances bought them irrespective of gifts.

In the local papers was inserted first a preliminary announcement, followed by a full-page advertisement, and finishing with a half-page advertisement. Announcements also appeared on the hoardings and the screen of local cinemas.

An invitation card and a personal hand-written note, varied to suit each individual, was sent by post to all the builders, councillors, and leading citizens. The same invitation was sent to all-electric houses, of which there are about 50 scattered over Ely. This enabled personal interviews to be arranged at the Exhibition.

Mr. C. B. Staniforth (Engineer, Manager, and Secretary of the Company) acknowledges his indebtedness to the B.C.G.A., who were most helpful. They planned the stands, sent them down and fixed them, and took them down at the close. They also provided posters and draft advertisements, &c., as well as many ideas.

Apart from immediate sales, the Exhibition has done much to impress the people on Ely with the fact that gas is up-to-date.

Three Views of the Exhibition.

The Southern Association of Gas Engineers and Managers

Annual General Meeting.

The Annual General Meeting of the Southern Association of Gas Engineers and Managers was held on Friday, March 27, at the Hotel Metropole, London, under the Presidency of Mr. R. J. H. Clark, Engineer of the Plymouth and Stonehouse Gas Light and Coke Company.

Business Meeting.

The PRESIDENT, in opening the proceedings, expressed his pleasure at seeing such a representative gathering of members. He extended a hearty welcome to all those present.

On the motion of the PRESIDENT the minutes of the last meeting, as published in the "GAS JOURNAL," were approved.

On the proposition of the PRESIDENT, seconded by Mr. S. E. WHITEHEAD (Southampton), the Report of the Committee was unanimously adopted—the seconder adding a word of thanks to those who had compiled the Report.

Election of New Members.

On the motion of the PRESIDENT, seconded by Mr. A. H. ANDREWS (South Metropolitan), the following applicants were elected to membership of the Association:

C. H. Chester (Swindon), A. L. Broadberry (Hastings), H. Wyver (Whitstable).

Mr. E. L. NICHOLAS (Guildford) thereafter proposed that the President be appointed to represent the Southern Association on the Council of The Institution of Gas Engineers. This was seconded by Mr. JOHN TERRACE, who remarked that he had known Mr. Clark a long time, and the Institution an even longer time. Their President's qualities were of the kind they wanted for representation of this Association. The resolution was unanimously carried, and the PRESIDENT, in acknowledging this added honour, said that he would be only too happy to carry out their wishes in this respect and serve them as best he could.

The PRESIDENT went on to announce that Mr. D. C. Cross (Lea Bridge) had been elected by the Committee as an ordinary member to serve on the Council of the Institution. He was sure they would all agree to this.

Memento for the Retiring President.

The PRESIDENT said that his next duty was a very pleasant one. It was his privilege and pleasure to present to their retiring President, Mr. E. L. Nicholas, a silver salver as a memento of his year of office. The members of the Association would remember with gratitude the admirable manner in which Mr. Nicholas had carried out the duties of this office, the capable and genial way in which he had presided over their meetings, as well as the hospitable manner in which he had received the members on the occasion of their summer visit to Guildford. They had no hesitation in choosing him for their President, and he had filled that office with benefit to the Association and credit to himself. On behalf of the members Mr. Clark thanked him, and asked him to accept this salver as a token of their high regard and appreciation of his services.

Mr. NICHOLAS thanked the President for his kind remarks and the meeting for the way they had received them. It did not need, he said, any tangible effort such as this to remind him of a very happy year of office. If any thanks were needed he received them in full last year in the very kind way the Association had supported him.

The PRESIDENT then delivered his Presidential Address, which will be found on later pages of this issue.

Southern Association's Luncheon

Prior to the Annual Meeting of the Southern Association the members met at luncheon at the Hotel Metropole, when Mr. R. J. H. Clark presided over a representative gathering which included a number of distinguished guests, including Col. Norrington (Chairman of the Plymouth and Stonehouse Gas Light and Coke Company), Mr. G. H. Bolton (Secretary and Director of the Plymouth Company), Mr. A. L. Holton (Engineer of the Manchester Corporation Gas Department and President of the Manchester Association of Gas Engineers), Mr. J. R. W. Alexander (Secretary of The Institution of Gas Engineers), Mr. E. J. Fottrell and Col. S. S. Ogilvie (of the National Gas Council), Mr. W. D. Rowe (Manager of the British Commercial Gas Association), and others.

The Loyal Toast having been duly honoured,

Mr. S. E. WHITEHEAD (Vice-President of the Association) proposed the toast of "The Visitors," remarking that their Association had many friends outside their body without whom they would not be able to carry on. They were very pleased to acknowledge their indebtedness to those friends, and they were never happier than when they were entertaining them. Mr. Whitehead went on to extend a very hearty welcome to their guests. They had welcomed at this luncheon for many years past the Chairmen and Directors or members of the Committee and their Presidents, and although they were always very glad to see those gentlemen with them, they were often strangers to the Association. On this occasion, however, they were very fortunate in knowing them. First of all they had Col. Norrington, Chairman of the Plymouth Company, which, as they all knew, was one of the bulwarks of the Gas Industry in the west, having during the past twenty years increased their gas output by 20%—this steady advance being maintained. They were glad to have Col. Norrington with them not only because of his Chairmanship of the Plymouth Company, but also on account of his work on the National Gas Council and the Tar Board. They were also pleased to have Mr. P. S. Hoyte with them; while they welcomed him on this occasion as a visitor, they must not forget that he was one of the oldest members of the Association and also a Past-President. He also referred with pleasure to the presence of Mr. Holton, Mr. Stephen Lacey (Senior Vice-President of The Institution of Gas Engineers), Mr. J. M. Webber and Mr. F. H. Higton (of the London and Southern District Junior Gas Association), Mr. K. L. Clarke (of the Western Junior Gas Association), Dr. Lander, and many others who he was sure would forgive him if he did not mention them by name. He also referred with gratification to the presence of representatives of the Technical Press. He asked the members to drink to the health of all their visitors.

Col. NORRINGTON, in responding to the toast, remarked that they had paid the Plymouth Company some very nice compliments, but perhaps the nicest of them was when they chose their Engineer, Mr. R. J. H. Clark, to be their President; they were very glad indeed that they had done this. They were looking forward to the Association's visit to Plymouth in the summer, the provisional date for which had been fixed for Tuesday, June 30. He hoped they would find something of interest when they visited their works. In conclusion, Col. Norrington said that if his fellow visitors had enjoyed the Association's hospitality half as much as he had, their feelings could best be expressed in the simple words "Thank you very much indeed."

Mr. A. L. HOLTON also responded on behalf of the visitors, observing that he was very happy to be associated with Col. Norrington in replying to this toast. He wished the President and the Southern Association a year of great prosperity, remarking that he himself had as great an enthusiasm for the Gas Industry as ever.

Mr. STEPHEN LACEY, in proposing the toast of "The Southern Association of Gas Engineers and Managers," said he felt sure he was right in saying that the great majority of the members of this Association were also

members of The Institution of Gas Engineers, and this Association was, in common with the other District Associations, affiliated to the Institution and had representatives on its Council. Col. Carr would have liked to have been present, but was unfortunately prevented from being with them. He had, however, asked Mr. Lacey to convey to them his best wishes to the President for a successful year of office. The work of this Association was complementary to that of the Institution, and there was no doubt that this Association included all, or nearly all, the responsible executives of gas undertakings in the South of England, which gave it a great deal of power and influence in the commercial and technical policy of the Industry. In asking them to drink the health of the Association, he coupled with the toast the name of Mr. R. J. H. Clark, than whom they certainly could have no better President.

The PRESIDENT, in responding, said that he had the honour to convey to Mr. Lacey their very sincere pleasure at his presence on that occasion as Senior Vice-President of The Institution of Gas Engineers and to thank him for the very kind way in which he had proposed the toast of "The Association." They were all greatly indebted to him for his presence as representing the Institution and for his encouraging remarks. Their Association covered such a large area that they had to have two sections, and they looked forward to these General Meetings as being the only opportunity of meeting as one body and renewing old friendships and making new ones. Coming as he did from the South-West, he particularly appreciated the advantages of this Association, as without their meetings his own professional career would certainly have been very much the poorer; and he suggested that the same might equally well apply to all of them. It was necessary for all those holding executive positions to discuss the problems of the day as they were able to do at this and their regular monthly meetings. In conclusion, Mr. Clark said he welcomed this opportunity of saying how much he appreciated the presence and support given him by his Chairman and Directors at this first assembly over which he had the honour to preside, while he would also express his pleasure at the presence of so many distinguished guests.

Coke Oven Managers' Year Book—1936

Continued Usefulness

The Coke Oven Managers' Year Book, 1936, published by Benn Bros., Ltd., for private circulation only, is now firmly established as a record of practical work and information, valuable to all who are in any way interested in coking practice.

In this, as in previous issues, the usefulness of the book is preserved by the inclusion of only such matter as is considered likely to be of service. Included in the contents is useful information on the revised rules and membership of the Coke Oven Managers' Association, with lists of officials, Past-Presidents, and Members. Further progress has been made in the compilation of the list of coke oven plants abroad. This year has been added the private telephone numbers in the List of Members wherever they have been known, and the Association has now adopted the recognized spelling of the word "benzole."

The remainder of the volume is devoted to the transactions of various sections of the Association, full reports, with photographs and diagrams, being given of the various Papers read. Altogether this is a very useful book, summarizing in a comprehensive manner another year's activities of our sister industry. Users of the book should find it fully as valuable as its predecessors.

A Useful "Ascot" Publication

Third and Completely Revised Edition

Dr. Bernard Friedman and the Technical Staff of Ascot Gas Water Heaters, Ltd., are again to be congratulated on the excellence of their third and completely revised edition of "Notes Relating to the Physics and Chemistry of Heating Water by Gas-Fired Appliances." The book is well produced in clear type and profusely illustrated with explanatory diagrams of the type for which the Ascot Company has become famous.

The ingenious method has been adopted of showing all purely theoretical matter in small type. The practical man can thus ignore this if he be so inclined and see at a glance only the main subject matter. The book is divided into three main sections—Theoretical Considerations, Practical Considerations, and Useful Data. Of the last it could be said that the data are not only useful, but invaluable, for a thorough appreciation of modern water heating practice.

The first section deals in logical sequence with definitions, combustion, and air requirements. A concise explanation of the distribution of heat in gas water heaters is followed by a clear exposition of the factors affecting fluid flow. The section concludes with the treatment of hot water circulation and heat transfer and its relation to gas water heaters.

The second section begins with descriptions of coke boiler systems and alternative gas systems. Then follow notes on the installation of water heaters and flue equipment. Excellent descriptions, with drawings, are given of every type of "Ascot" water heater and its valve mechanism. This section should prove of great assistance to those responsible for maintenance work as well as those who install and adjust "Ascot" heaters.

The final section is mostly in the form of handy tables and graphs dealing with gas and electrical comparisons, including lists of correct gas rates, time taken to fill baths, notes to builders, hot water costs, water regulations, pipe size tables, and many other subjects. Finally, the up-to-date nature of the book is typified by the note and table dealing with the use of "bottled" gas.

Every modern aspect of the subject has been covered, including reference to recent technical papers and publications. The author has obviously gone to considerable pains to ensure that the information should be reliable as well as being presented in a simple and logical manner. The book should be in the possession of every district salesman and fitter, while students of Gas Supply and Gas Fitting will find in it a fund of information of direct benefit to them. Although the price is 2s. 6d., we understand that Ascot Gas Water Heaters, Ltd., will be pleased to distribute, on request, complimentary copies to all members of the Gas Industry and those connected with the Industry.

Truro Showrooms Opened

Ceremony Performed by Dr. E. Leslie Burgin

"We realize by these new showrooms that a gas undertaking, besides selling gas, has to sell service," said Dr. E. Leslie Burgin, M.P., Parliamentary Secretary to the Board of Trade, when opening the new showrooms of Truro Gas Company on Friday, March 27. The premises are in Boscawen Street, on the site of the old Agricultural Exchange. Describing the showrooms as marking a milestone in the history of the Company, Dr. Burgin said that people in the city of Truro realized now that it was no longer true that dividends were made only in the retort house. Redruth, he mentioned, over 140 years ago became the first town to light its offices with gas. That was in 1792.

Mr. S. J. Ingram, Chairman of Directors of the Company, who presided, said that while in 1850 the Directors gloated over the fact that 22,000 cu.ft. of gas went out of the works in a day, at the present time that quantity went out in half an hour. "The Gas Industry in Cornwall," added Mr. Ingram, "is to-day a united, progressive body."

Mr. J. R. Paull, seconded by Lieut.-Col. J. Reid Hythe, thanked Dr. Burgin for having performed the opening ceremony.

Gas for Potato Crisp Making

We learn from Mr. A. D. Howells, Engineer and Manager, that the Abergavenny Gas Department has been successful in obtaining a load of 14 million cu.ft. per annum at a local potato crisp factory after extensive tests had been carried out in competition with crude oil. The annual sales of the Department last year amounted to nearly 59 million cu.ft.

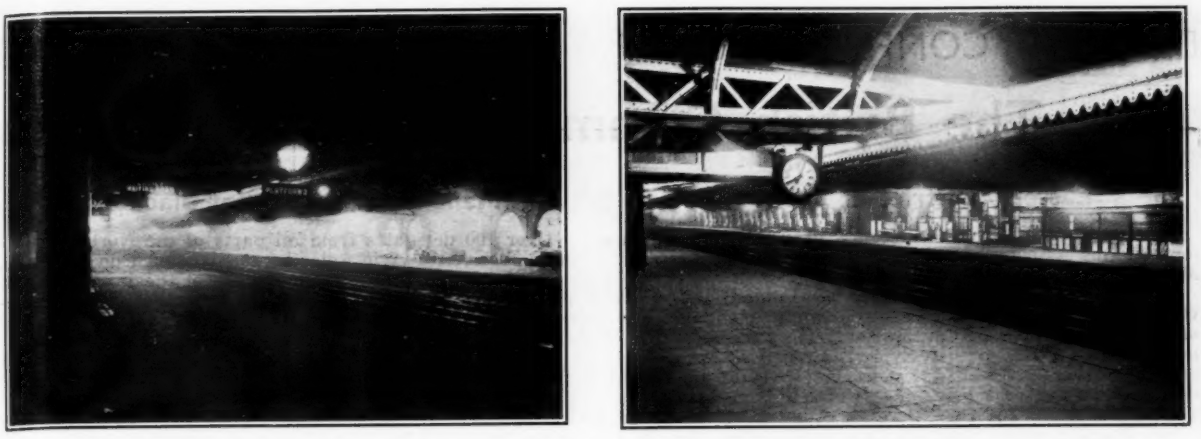
Improved Gas Lighting of Sheffield Railway Station

At a time when considerable interest is being taken in the lighting of railway stations by gas, the accompanying photographs, for which we are indebted to Mr. Ralph Halkett, show the remarkable improvement which has been effected in the lighting of the L.M.S. station at Sheffield by the adoption of new gas units.

For some time the Sheffield Gas Company has been in negotiation with the Railway Company with a view to improving the lighting arrangements by the installation of modern type gas lamps.

The Railway Company have now carried out certain alterations in the station, and the new lamps include approximately seventy 4, 5, and 6 light "Littleton" outdoor lamps, each unit being fitted with a distant control device, with special arrangements made in the piping installation to allow for sectional lighting and extinguishing on the various platforms, each section being operated from a control tap placed in a convenient position for use.

As may be judged from the accompanying photographs, the improvement in illumination is very noticeable, and the new installation of lamps has been favourably commented upon by the travelling public.



Two further examples of the improved lighting of the Sheffield Railway Station, referred to on the opposite page, are shown in the above photograph. The excellence of the lighting arrangements may be judged by the fact that at any point on the various platforms it is possible to read with the greatest of ease.

Publicity for Solid Smokeless Fuel

London and Counties Coke Association Launch Display Scheme

Gas publicity has so been taken for granted in recent times—thanks to the co-operative efforts of the B.C.G.A. and the undertakings themselves—that the fact is apt to be lost tight of by those who also desire to sell their coke that this product, too, must be advertised, and advertised more and more if the public is to be educated as to its true merits as a clean, adaptable, smokeless fuel. Splendid work has been done in this connection since its formation by the London and Counties Coke Association; but that body can no more make itself responsible for all coke publicity than could the B.C.G.A. perform a like service in regard to gas. There must be local co-operation. Unfortunately even to-day there are undertakings who have coke to sell and seem to think it can sell itself (few things can do this nowadays), and do not even adopt the elementary method of showing samples of graded coke or coke-burning appliances—much less publicity matter—in their showrooms.

With a view to assisting gas undertakings within its area in their coke publicity, the London and Counties Coke Association has now launched a new service which should prove of considerable benefit to its members. Recognizing that advertising is essential to maintaining coke sales and ensuring a steady expansion of the trade, the Association emphasizes that the growing importance of the domestic coke market necessitates greater effort in local publicity. To this end, therefore, in consultation with the B.C.G.A. studios, a series of six displays, posters, and showcards has been produced suitable for showroom and window exhibition. These displays deal with various aspects of coke usage, and each forms a very attractive appeal for the showroom window—bringing home to the public the possibilities of coke for heating, without in the least detracting from the parallel. The prices and full particulars, including illustrations, of each display are set out in a leaflet which the Association is shortly mailing to all its members. The displays can, if desired, be purchased individually, or, alternatively, the full scheme of all the display material—*i.e.*, six displays, one poster frame, two posters, and two showcards with frames—can be supplied at an inclusive charge. The posters are shown between glass, which enables two posters to be used at one time, the frame surround being attractively finished in chromium strip.

As a link-up with this display scheme a new brochure has been issued to demonstrate the advantages of coke for the open fire. this giving particulars and attractive illustrations of all the latest approved grates. There is little doubt that gas undertakings in the area will welcome the Association's new service and take advantage of the opportunity thus offered of getting consumers more coke-minded in a way which will not be detrimental to the sales of gas.

A Coke Distribution Branch.

Apart from the service to which we have just referred, we learn that the Association is continuing in other new directions to work actively in the interests of its members. One move is the formation of a Coke Distribution Branch, of which every distributor handling coke within the area of the Association is entitled to become a member—and as no distributor is likely to work outside this group, it may be regarded as all-embracing.

It is, of course, always a leading point in the policy of the Association to recognize the distributive trade, and a joint committee meets periodically to discuss matters relative to price, quality, and so forth, while assistance is also given in regard to publicity and technical service. In this way valuable work is being done to establish the most cordial relationship between the producers of gas coke and the distributive trade—work which is increasingly recognized as of benefit to all concerned.

The London and Counties Coke Association has proved its worth in a way that few within the area of its operations will dispute; and it is therefore gratifying to learn that the formation of district coke associations to cover other large centres throughout the country and to operate on similar lines to that in the metropolitan district is being contemplated. Mention was made of such a scheme to operate in the Midlands at the recent meeting of the Midland Association of Gas Engineers and Managers at Birmingham, while similar schemes for the West of England and Scotland, among other districts, are being considered.

For Firm Fixtures

The New Rawlbolt

The specialized study of fixing problems, which is continually carried on in the laboratories of the Rawlplug Company, Ltd., has been an important factor in the invention of the Rawlbolt. Ever since the introduction of the Rawlplug, thousands of pounds have been spent in experiments in order to discover the best methods of ensuring firm fixtures.

The exterior of the Rawlbolt consists of a tubular metal shell divided lengthwise into four segments. This shell is designed to give the greatest possible grip against the sides of the hole into which it is placed. For example, the surface is roughened, the segments have a saw edge, and there is a buttressed screw thread round the shell which assists the entry of the anchor, gives extra grip, and prevents turning in the hole. The upper ends of the segments are flexibly held together by the corrugated steel ferrule which is the latest improvement to this type of expansion fixing. There are occasions when the fitting must be pulled down exceedingly tight which is not possible without a certain amount of yield at the top of the anchor. This is provided for by the patent corrugated ferrule fitted to Rawlbolts. The bottom ends of the segments are held together by a spring ring which can be removed if necessary just before placing the anchor in position. There are no twisted wires to jam in the hole and prevent an absolutely firm fixing. The ferrule also has the effect of ensuring equal expansion of all four segments when the bolt is tightened up, and adds to the finish of the fixing.

One of the features of the Rawlbolt is the special forged head which forces open the segments when the nut is tightened. This is a gradual wedge shape which comes to a full circular shape at the head and ensures maximum pressure against the segments of the shell and in turn allows for the maximum expansion against the sides of the hole. The bolts themselves have standard Whitworth threads suitable for all types of work.

DISTRICT CONFERENCES OF

Ipswich and Blackburn.

The British Commercial Gas Association

Eastern District at Ipswich

The Eastern District Conference of the British Commercial Gas Association was held at Ipswich on Tuesday, March 24.

The Mayor of Ipswich (Mr. H. E. Holland) welcomed the delegates in the presence of many members and officials of the Ipswich Corporation. He stressed the importance of the Gas Industry. It consumed a tremendous amount of coal, and it was a very important factor in dealing with the abatement of smoke. Ipswich had a fine gas organization, and they were all proud of it.

Mr. Frank Prentice, who for 55 years has been identified with the Ipswich Gas Light Company, presided in the absence of Mr. Henry Woodall, Chairman of the British Gas Light Company, who was indisposed. During the course of his remarks Mr. Prentice said that throughout the whole career of the Ipswich Company the consumer had always been their first concern. Long ago they had started a superannuation fund, so that when work was finished the men could retire and spend their last days in comfort. Even that was not all. A few years back they instituted a co-partnership scheme. There was an idea abroad that gas was on its last legs, and that its young rival, electricity, was ousting it from serious competition. The best answer to that was that Ipswich, in company with other concerns all over the country, sold more gas last year than ever before.

Sir Percy Alden, M.A., Chairman of the British Institute of Social Service, who has devoted practically the whole of his life to social service, particularly in the East End, was the principal guest, and gave an inspiring and informative address on housing, health, and the Gas Industry.

Sir W. Gurney Benham, Chairman of the Colchester Gas Company, thanked Sir Percy for his interesting Address.

Luncheon.

There was a very representative company at the luncheon given by the Ipswich Gas Company. Mr. Prentice took the chair.

"The County Borough of Ipswich" was submitted by Mr. H. Stanley Taylor, President of the B.C.G.A., who spoke of the enterprise which Ipswich citizens had shown in the past in the variety of its industries, and said the town was singularly fortunate in having such a big variety of industrial establishments.

The Mayor, in response, added his word of praise for the Gas Company, for the community had to rely to a great extent on gas, which they had been told at the conference was still a vital force, not only to the town, but the country's welfare.

Mr. W. Ross Taylor, M.P., of the National Gas Council, proposing "The Gas Industry," remarked that it had consistently and successfully kept pace with the times, and even anticipated, in building up a great national service. It was an industry which had been in existence over a century and a quarter, but there were no signs of decrepitude or old age; it had found the secret of perennial and vigorous youth.

The Chairman, in response, spoke of Mr. Ross Taylor's association with the Industry, and in the course of his speech declared: I am not one who "runs down" electricity as against gas. I think that altogether wrong and retrograde. There is not only room for both, but they are complementary to each other.

The Deputy-Mayor, Mr. G. A. Mallett, who is Secretary to the Ipswich Gas Light Company, in welcoming the visitors said it was a fact that the Ipswich Company had been in existence 115 years, supplying the borough to an increasing extent all that time, and last year breaking all records.

Alderman F. L. Bland (East Suffolk) and Alderman S. J. S. Sampson (Deputy-Mayor, Bury St. Edmund's) responded.

Women's Session.

Later, Miss Holland presided in the Council Chamber, when Mrs. Eileen Murphy gave an address entitled "Men, Women, and Gas," urging that all through the day gas was making women's work more easy and more pleasant. And the more gas was used the healthier their towns would be.

Manchester District at Blackburn

Over 100 delegates from all parts of the North-Western Area received a civic welcome at Blackburn on March 25, at a Manchester District Conference of the B.C.G.A. The proceedings were held in the Public Halls and were presided over by Councillor R. R. Fielding, Chairman of the Blackburn Corporation Gas Department.

In extending a welcome to the Conference, the Mayor (Mr. William Coupe, J.P.) referred to the services rendered by gas in the abatement of smoke, the provision of smokeless fuel, and in a general contribution towards the amenity of the homes of the people in modern appliances.

The Mayor was heartily thanked on the proposition of Mr. J. Sandon Stubbs, Secretary of the Liverpool Gas Company.

The delegates received a further welcome from Councillor R. R. Fielding, Chairman of the Blackburn Undertaking.

The Chairman read a letter from Sir Francis Goodenough, C.B.E., Executive Chairman of the B.C.G.A., expressing his keen regret at inability through illness to visit Blackburn in order to attend the meeting as he had hoped. On the suggestion of Councillor Fielding it was decided to send a telegram to Sir Francis, regretting his absence and expressing the hope that he would make a speedy recovery.

Mr. F. C. Hooper, a Director of Messrs. Lewis, Ltd., the well-known multiple stores of various Lancashire towns, then dealt with some general principles of salesmanship.

Councillor H. Johnson, Vice-Chairman of the Blackburn Gas Committee, moved a vote of thanks to the speaker, and Mr. E. Crowther, of Salford, seconded.

Luncheon.

At the luncheon held in the Public Hall, Councillor Fielding proposed the Loyal Toast. "The Town and Trade of Blackburn" was submitted by Councillor W. P. Jackson, Chairman of the Manchester Corporation Gas Committee. The Mayor of Blackburn responded.

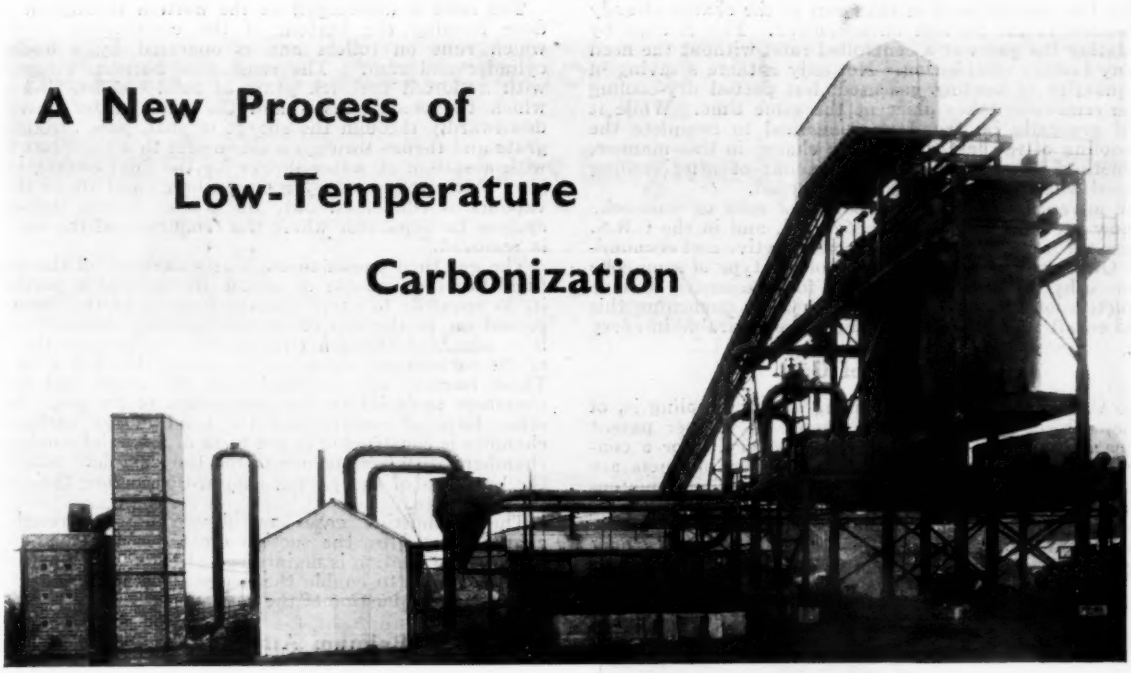
Capt. G. S. Elliston, M.P., for Blackburn and a former Chairman of the Health Committee for the City of London, in proposing "The Gas Industry," expressed regret at the illness of Sir Francis Goodenough. He said he had had a close connection with the B.C.G.A. ever since its formation. He first met Sir Francis in 1910 when the B.C.G.A. was being formed, and he was particularly interested in it at that time as he was to-day, because he looked upon it as part of a great Health Preservation Movement.

Mr. A. L. Holton, Chief Engineer of the Manchester Gas Department, said there was no semblance of decay about an industry which held its own in times of depression, and at the first sign of revival leaped forward. It was significant that in Blackburn, despite its 32% of unemployed, they were quickly getting back to their peak load for gas. Of 34 returns of gas companies for 1935 the average increase had been well over 6%, while one concern showed an increase of 20%. With advances such as these they had no need to get in the doldrums concerning gas and its future. In their Industry they were proceeding on the lines laid down by Mr. Hooper during the conference of dividing the production and sales sides. As an industry, they were anxious to serve the nation, and they wanted to be looked upon as a national unit and given all the help possible so that they could function as they wished to do. He believed the Industry had a bright future ahead of it. In Manchester they had a fleet of 45 lorries sending out supplies of smokeless fuel, and the Manchester coal fog was nothing like as bad as it used to be. It should not be forgotten that Manchester was the home of the Smoke Abatement Society, and the Gas Industry was alive to the needs of the nation, and wanted to supply those needs.

Women's Session.

At the Women's Session Mrs. Wm. Coupe, Mayoress of Blackburn, who presided, praised the work of the Gas Undertaking. Mrs. Eileen Murphy, Home Service Director of the B.C.G.A., spoke on "Men, Women, and Gas." After dealing with the numerous modern gas appliances, all of which saved labour and added to comfort, Mrs. Murphy went on to say that most of her audience knew that vitally important slogan—"Buy British." All the coal used for gas-making was British and the Gas Industry kept seventy thousand British miners at work.

A New Process of Low-Temperature Carbonization



A System evolved by the Coal Research Syndicate for the Production of Solid Smokeless Fuel from non-caking or weakly-caking coals.

By
A. R. GRIGGS,
M.Inst.M , F.R.S.A., Assoc.M.Inst.Gas E.

The process of the Coal Research Syndicate as developed under their patents is based upon the low-temperature carbonization of a static charge of coal in internally heated chambers of large capacity. The development is the outcome of a number of years' research work.

At the outset it was realized that great economy could be achieved in first cost of plant, operation, and maintenance if a method of bulk carbonization could be successfully operated under controlled conditions. It has been demonstrated on a full commercial size unit that the process of the Coal Research Syndicate could secure the desired results by carbonization by internal heating in a closed chamber in which a system of circulation of hot products of partial combustion of coal gas evolved during the carbonization is maintained downwardly through the charge of coal. It was realized at once that it was necessary to prevent at all times any internal combustion of the solid material being carbonized, and that gaseous combustion out of contact with the charge must be controlled to exclude any excess of oxygen above that required to burn the required amount of gas to effect carbonization.

No Burning of the Charge.

The combustion of any carbon of the coal or coke is directly opposed to the principle of the C.R.S. process. All the heat required to effect the carbonization is derived from the combustion of the fixed gases necessarily produced during the distillation of the coal. Thus in the solid residue the maximum quantity of fixed carbon is conserved. This is of fundamental importance from the economic point of view, since it is from the sale of coke or semi-coke that the main source of revenue is derived. Moreover, even a small degree of surface combustion of the carbon of the semi-coke is detrimental in its effect on the ash and volatile matter content.

Again, if all the heat required to effect carbonization of the coal were obtained by combustion of the solid residue, the yield of coke might be reduced by as much as 2 cwt. per ton of coal, and if the low grade gas normally produced by such a process could not be disposed of at a profit, then the above loss of solid fuel might entail a reduction in the profit to the undertaking by as much as 25% to 35%.

In the C.R.S. process the required amount of fixed combustible gases resulting from the carbonization is returned, after the removal of the tar oil vapours, to the top of the carbonizing chamber, where the gases are partially combusted out of contact with the charge. Air is admitted in controlled quantity, and the hot gases pass downwardly through the charge to the bottom grate. In the passage through the charge the hot products of combustion mixed with a certain amount of coal gas produced during carbonization cause a hot zone of distillation to travel evenly downwards in advance of a preheated zone which has been heated by the gases passing through the distillation zone. In preheating the coal before carbonization the gases are cooled and for a greater part of the carbonization the heat exchange is almost complete, very little after-cooling being required. A portion of this cooled mixed gas is returned to the top of the carbonizing chamber after passing through the condensing and scrubbing plant, and is burned with the necessary quantity of air to furnish the required amount of heat to effect the distillation of the charge.

Ease of Control.

The quantity of gas circulating through the charge is always materially in excess of the amount of air required for its complete combustion, and the speed at which the gas is circulated, and the amount of air admitted for the partial combustion of the gas, are controlled to give the proper speed and temperature of distillation. It is upon the balance of these two factors that the necessary carbonizing conditions for any particular class of coal depend.

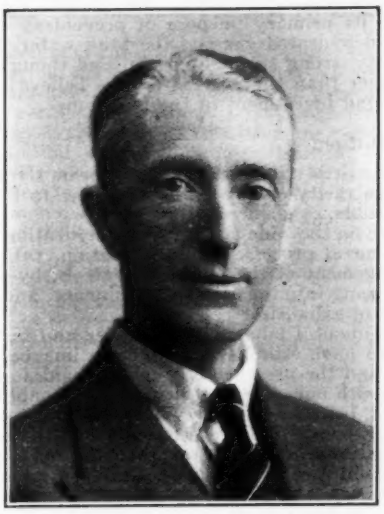
The whole process of carbonization is most adaptable to control, and arrangements have been perfected whereby automatic control by thermostatic means provides direct regulation of the rate of heat input to, and temperature of, the charge. The response to such control is direct and quick, as there are no containing walls through which the heat must first travel at varying rates, depending upon the temperature difference between the outside and inside of the walls. It thus becomes possible successfully to carry out carbonization in bulk, with the consequent savings in operating costs, and at the same time to produce a smokeless fuel in the form of semi-coke which is of uniform quality and controlled volatile content.

As soon as the volatile products are formed in the distillation zone, they are immediately removed, entrained in the downwardly passing gases, and passed through the cooler portions of the charge. Any secondary decomposition of the oil vapours is prevented, and the temperature at which they are formed is the highest temperature to which they are subjected. Thus a high yield of good quality tar oil is produced.

Dry Cooling of the Coke.

Besides the economy in gas cooling effected by the heat exchange between the hot gases and the coal about to undergo carbonization, another method of heat exchange results in still further economy in the amount of heat required to carbonize the charge. When carbonization of approximately two-thirds of the charge has been completed, the remaining one-third can be carbonized by merely trans-

The Southern Association of Gas Engineers and Managers



THE PRESIDENT,
R. J. H. CLARK, of Plymouth.

Mr. R. J. H. Clark was born and educated in London, and after six months' training at Exeter School in the engineering branch connected with Messrs. Willey & Co., he went to Plymouth in 1903, where he served for four years as articled pupil under Mr. P. S. Hoyte, M.Inst.C.E., then Chief Engineer to the Plymouth and Stonehouse Gas Light and Coke Company. Having served for nearly two years as second assistant, he was, in 1908, appointed Chief Assistant Engineer to the Plymouth Company. He succeeded Mr. Hoyte as Chief Engineer upon the latter's retirement in 1928. Mr. Clark was elected to membership of The Institution of Gas Engineers in 1922 and of the Southern Association in 1928. He has been with the Plymouth and Stonehouse Gas Light and Coke Company for 33 years, during which period the sales of gas have increased from 931 millions to 1,789 millions per annum.

Presidential Address

OF

R. J. H. CLARK

(Engineer of the Plymouth and Stonehouse Gas Light and Coke Company)

Presented at the Annual General Meeting of the Association held at the Hotel Metropole, London, on Friday, March 27, 1936.

Gentlemen,—My first thought is to offer you my most sincere thanks for the honour you have conferred in appointing me your President for 1936. I realize that the distinction is shared by the Company I have had the pleasure of serving for the past 33 years, and I give you my assurance that it is indeed greatly appreciated, particularly as this is the second occasion upon which one of my Company's officials has occupied this chair. In 1923 Mr. P. S. Hoyte, who was then Chief Engineer to the Plymouth and Stonehouse Gas Light and Coke Company, gave his Presidential Address to this Association. Although I now occupy both the positions he graced 13 years ago, I am happy to say that Mr. Hoyte, as one of my Directors, and in other ways, is still actively engaged in the interest of our undertaking and that of our great Industry generally.

My second thought has naturally been concerned with the subject matter of this Address. In the absence of any opportunity to describe unusual plant or process, or the ability to discourse on abstract themes, I have decided to describe to you the additions made to our Works and district since 1923, and to outline our present sales policy.

Although sadly lacking in originality, I am heartened by the realization that whenever gas men gather together they never seem to tire of hearing about what the other fellow is doing. I therefore hope that you may find something of interest in our activities at Plymouth, and my pleasure will be complete if I can stimulate that interest sufficiently to induce many of you to visit our historic City during the Summer Meeting.

The growth of our business in the intervening years, if not spectacular, has at least been fairly steady, with the result that our annual output has increased from 1,426 million cu.ft., or 6,417 thousand therms, in 1923 to 1,789 million cu.ft., or 8,050 thousand therms, in 1935. Although unable to give figures for the present financial year ending March 31, I am happy to state that for the nine months ending Dec. 31 last, the output of gas, the sales of coke, and the sales of gas consuming appliances each constituted a record in the history of my Company.

The following table shows the increase in the number of consumers over the same period, also the consumption per consumer including the years during which the maximum figures were reached:

—	1923.	1929.	1931.	1935.
Ordinary consumers . .	19,362	20,859	20,975	21,270
Prepayment ,, . .	19,121	22,699	23,817	27,002
Total ,, . .	38,483	43,558	44,792	48,272
	Therms.	Therms.	Therms.	Therms.
Consumption per consumer—				
Ordinary	215	247	243	226
Prepayment	114	129	130	116
Average	165	185	183	164

Works Department.

This increased demand has led us to install some considerable amount of new plant and to modernize certain existing sections, and I propose briefly to outline the work.

Manufacturing Plant.

Touching first on manufacturing plant, the old installation of inclined retorts, erected in 1903, was demolished in 1924 to make way for an installation of 72 Glover-West Vertical Retorts of the 33 in. model, with a nominal capacity of 4 million cu.ft. per day. There are 9 benches, and each individual retort is provided with a West-Taylor patent valve, regulating a supply of steam in accordance with the temperature, rate of carbonization, and quality of gas which it is required to produce.

The waste gases from the settings are led through two Kirke's type boilers, constructed by Messrs. Spencer-Bonecourt on the induced draught fire-tube principle. Each boiler is capable of evaporating 7,000 lb. of water per hour from and at 100° C., and is equipped with "Thermofeed" regulator and "Hilo" water level alarm, thus ensuring safety in working, uniform water level, and a minimum of supervision.

Owing to the difference in wear and tear, coal and coke are handled separately by West's lip-bucket conveyors, two lines of which encircle the retort bench, although each can fulfil the dual purpose when required. The coke leaves its conveyor for a receiving hopper, which delivers it to a Poole screen, where it is graded as required, and the residue passed on to a storage hopper fitted with an automatic skip filler associated with our telpherage system.

At the same time as the vertical retort installation was being erected it was decided to remodel one of our four carburetted water gas units, equipping it with a waste-heat boiler, new turbo blower, and means for automatic operation. The work was entrusted to Messrs. Humphreys & Glasgow, and as the automatic operator was the first

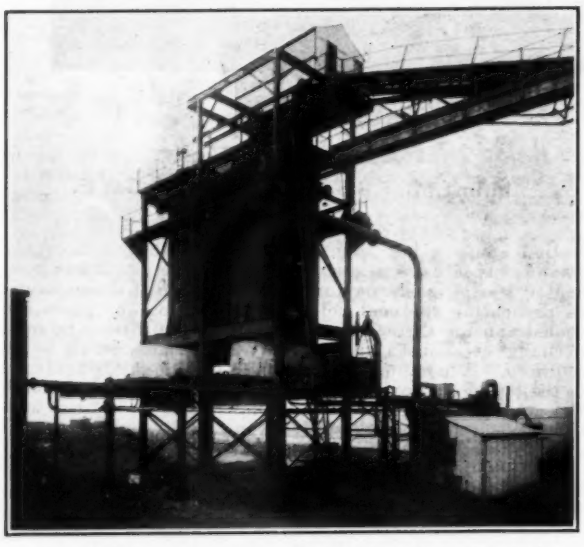
ferring the sensible heat in that part of the charge already carbonized to the portion uncarbonized. This is done by circulating the gases at a controlled rate, without the need for any further combustion. Not only is there a saving in the quantity of heating gas used, but partial dry-cooling of the semi-coke takes place at the same time. While it would generally be found uneconomical to complete the dry-cooling of the last part of the charge in this manner, the method largely reduces the amount of after cooling required when the semi-coke is discharged.

The advantages of the dry-cooling of coke or semi-coke are now becoming generally recognized, and in the C.R.S. process the method described is both effective and economical. Owing to the high reactivity of the type of semi-coke produced by the process it has been found essential to have complete cooling. If carried out by water quenching this would entail a good soaking, which is undesirable in every way.

Recovery of Gas.

The C.R.S. process of carbonizing and dry-cooling is, of course, subject to patent applications. A further patent application covers a method of gas recovery. For a considerable portion of the time no combustion products are diluting the coal gas with inert constituents, and this enables the greater part of the coal gas not utilized for heating to be recovered. This implies an important economy.

The gas normally produced in internally heated carbonizing plant is of too low a calorific value to be of interest



The C.R.S. Plant at the Colliery of the Bolsover Company, another view of which appears on the preceding page.

to the Gas Industry generally. On the other hand, low-temperature gas of from 750 to 850 B.Th.U. per cu.ft. is too high in calorific value for mixing with town gas. The composition of the latter is different and dilution does not altogether bring about the desired characteristics—in fact, it would appear necessary to subject normal low-temperature gas to a process of "reforming" such as is employed in the United States for the oil gas from the "fields" and refineries, if it is to be mixable in any desired proportions with 450 to 500 B.Th.U. town gas.

By the Coal Research Syndicate's method the calorific value of the coal gas, which is recovered undiluted by products of combustion, can be controlled and adjusted so that it may conform as near as possible to the average composition and calorific value of the gas normally manufactured by the Gas Industry.

Description of the Plant.

The carbonizing chamber is a simple vertical steel-plate shell lined internally with firebrick. Absence of any complicated external heating flues and combustion chambers permits of a simple and robust construction. There is no fear of damage in lighting up or letting down, and the former operation can be performed so quickly that the plant can commence to operate within two hours.

In charging the carbonizing chamber, special arrangements are provided to ensure proper distribution of the coal and to avoid dropping of the material from a height, which would result in undue breakage. The new method of charging devised is simple and effective, and the operation can be quickly and efficiently performed from an overhead charging hopper in a minimum time.

The coke is discharged at the bottom through a large door forming the bottom of the carbonizing chamber, which runs on rollers and is operated by a hydraulic cylinder and ram. The removable bottom is furnished with a slotted firebrick grate of solid construction upon which the charge rests, and the gases, after travelling downwardly through the charge of coal, pass through the grate and thence through a side outlet to a wash-box fitted with a system of water sprays for the final cooling of the gas. After this primary cooler, where the bulk of the tar vapours is condensed out, the gas is drawn through a cyclone tar separator where the remainder of the light tar is removed.

The gas then passes through an exhauster of the centrifugal fan type motor or steam driven, and a portion of it, as required to carry out the heating of the charge, is passed on to the top of the carbonizing chamber. Here it is admitted through two opposite burners in the head of the carbonizing chamber and above the charge of coal. These burners are provided with air inlets and mixing chambers to facilitate the combustion of the gas. In another form of construction the head of the carbonizing chamber is constructed in the form of a special combustion chamber, with arrangements for the complete mixing of the products of the partial combustion before their entry to the charge.

The combustion gases are drawn down through the charge of coal by the suction created by the exhauster, and a slight suction is maintained at the top of the carbonizing chamber to enable the necessary air to be drawn in for partial combustion of the gas.

Minimum Attention Needed.

After combustion has been initiated above the charge a regulated "pull" is maintained on the carbonizing chamber, and the hot gases are drawn downwardly through the charge. The condition having been set, carbonization proceeds regularly without any attention for some twelve hours or so until the downwardly travelling zone of carbonization has reached a point about two-thirds of the depth of the charge. There is then sufficient sensible heat in the upper two-thirds of carbonized material to complete the carbonization of the remaining third of the charge. This is accomplished by merely shutting off the air to the burners and circulating gases alone at a controlled rate through the charge for a further six hours or so, when carbonization is completed. Except for occasional observation of the rate of temperature rise at the base of the carbonizing chamber, no further attention is required until it is time to discharge the material.

The demonstration plant at the Colliery of the Bolsover Company, put to work in the early part of 1935, consists of two full-sized commercial units, each taking a charge of 33 tons of coal, and they are designed to complete the cycle of operations within the 24 hours. The plant has continued at work since that date, except for short periods for preparations of tests.

This plant is equipped with coal handling and charging apparatus, but no special equipment has as yet been installed for handling and screening the coke after it has been discharged from the carbonizing chamber as would, of course, be provided in a large installation.

No benzole recovery plant has yet been provided, but the system of tar recovery installed permits of all but a very small quantity to be recovered. The necessary apparatus for benzole recovery and complete tar extraction offers no problem, however, and it is only necessary to provide standard and well-tried-out equipment for this, as would be done in a large-scale installation.

Numerous tests have proved that the process is also very suitable for the large scale treatment of lignites, cannel coal, besides weakly caking or non-caking bituminous coals.

The important advantages claimed for the bulk carbonization carried out according to the process of the Coal Research Syndicate are:

(1) Low capital cost of plant.
(2) Low upkeep and maintenance charges.
(3) Low cost of operation in which low-skilled labour charges are an outstanding example.
(4) Extreme simplicity of operation and control of the carbonization process.
(5) Ease and rapidity with which the plant can be started up and shut down with no possibility of damage.
(6) Robustness of construction and absence of complicated firebrick furnace work and heating flues.
(7) No standing charges as regards keeping carbonizing units under slow fire when not required, and no expensive and long heating-up periods.
(8) Being of unit construction the plant can be cheaply extended when and as required.

safety measures, receive detailed reports of any accidents, and where possible devise means for preventing their recurrence.

We have a system of encouraging suggestions of any appropriate nature from our employees, including those affecting safety, and these latter are carefully considered by the Safety Committee and adopted where thought fit. A monetary recognition is made of all approved suggestions.

Examination of the accidents which have occurred on our Works during the last few years has led us to the conclusion that the human element is at present the largest factor in accident causation. I may mention that all the proceedings of the Safety Committee are carefully minuted and an Annual Report is circulated among the members. Incidentally, a copy of this report is also sent to the local Home Office Inspector, and contributes, I believe, to the very harmonious relationship which exists between that official and ourselves.

Distribution Department.

While considerable additions have been and are still being made to our Distribution Department, the general scheme introduced by my predecessor has called for little modification.

The additional labour employed is shown in the following table:

—	1923.	1935.	% Increase.
Gas fitters	68	107	57·3
Apprentice fitters	10	23	130·0
Other occupations . . .	84	167	98·8
Total labour . . .	162	297	83·3

Suitable additions to the clerical and technical staffs, together with appropriate accommodation, have met the needs for increased supervision and the keeping of all kinds of records.

An important feature of our organization is the division of our area of supply into six districts, each under the care of an inspector, the use of a small car greatly facilitating supervision on the outer districts.

Apprenticeship.

For many years it has been our policy to cater for the fitting of appliances and carcassing of houses, and to ensure the maintenance of a well-trained and efficient personnel, a scheme of apprenticeship in gas fitting has been in vogue.

We find no lack of candidates for apprenticeship, but knowing how much our future relationship with the public must rest in their hands, the utmost care is exercised in making selections, and an approved medical certificate and satisfactory three months' probation are insisted upon in every case. The excellent practical and theoretical instruction provided at the local Technical College is supplemented on two half-days per week during the summer by special classes at our Works, when heavier jobs in lead, iron, and sheet metal are dealt with.

During the last two years of apprenticeship encouragement is given to the most promising boys, who are entrusted with more responsible work, with extra pay. At this stage each boy is loaned a first-class kit of tools, for which he commences to pay as soon as he receives full fitter's wages. This scheme has much to commend it and leaves no excuse for poor work on the grounds of inability to provide suitable tools.

My Company awards two prizes annually to those apprentices obtaining the highest marks at the Technical College, and further refunds all fees to those obtaining a minimum of 50%. On completion of indentures, possession of the City and Guilds Certificate in Gas Fitting is the *sine quâ non* for all those seeking permanent employment with the Company, while wholesome competition is fostered by a system of grading into six grades, the wages in which each advance by 2s. per week.

I offer no excuse for dwelling upon this subject at length. The supply of trained gas fitters is at present barely equal to the demand, and if the growing need for fitting and maintaining the multiplicity of modern apparatus is to be adequately met, it is imperative that we should make our own arrangements for the supply of a well trained and efficient personnel.

Bonus to Builders.

Yet another problem arises from the standard both of material and workmanship employed by certain builders, who are not infrequently prone to place cheapness before quality. To overcome this difficulty a scheme was initiated in 1932, whereby a bonus of 5s. per point becomes payable by my Company to any builder in our area who accepts our specification as to size and quality of material, and who carries out work to the satisfaction of our Inspectors.

Area of Supply.

Turning to our area of supply, a Special Order obtained in 1930 conferred powers for the extension of our district in both a northerly and easterly direction.

Fig. 1 shows our present area of supply, together with the principal extensions made since 1923. During the past 12 years our mains have increased in length from 105 to 162 miles, an increase of some 54% compared with the addition of only 25% to the number of our consumers.

I may perhaps be permitted to observe that, apart from a very few undertakings which supply the bulk of their gas for industrial purposes, published statistics show our consumption per mile of main to be the highest in the British Isles, and this despite its having fallen from 15·6 to 11·0 million cu.ft.—a drop of 29%—during the last 7 years.

Such a drop—and this is, of course, by no means peculiar to Plymouth—is eloquent of the modern tendency for former town dwellers to leave their old surroundings and move out towards the country. Fostered by cheap and rapid transport facilities, the tendency has much to commend it, but the changed demand which it imposes upon our distributory systems cannot be too promptly recognized and catered for.

The requirements of our area of supply present certain somewhat unusual features, some, but by no means all, of which are revealed in fig. 1.

The low lying and more central parts of the City are adequately provided for by a low-pressure system backed up by Works boosters, while the area to the north is served by a separate system similarly reinforced.

Gas for the latter district is supplied *via* a 24 in. district governor, on the outlet of which somewhat of a bottle neck known as "the Mutley Main" has developed, due to abnormal building activities further North. This restriction necessitated an uneconomic extension of boosting periods until dealt with as part of a general scheme, shortly to be described.

Our third area—a somewhat scattered one to the east of the City—has been developed since 1910 by a separate high-pressure system, and by 1931 accounted for some 6% of our total output.

During that year we enlarged our high-pressure supply so as to meet increasing demands in the older districts, extend further eastward to two outlying villages, and in a north-westerly direction to Crownhill for the at least temporary relief of our Mutley Main. This work was completed in 1932, and three years later our high-pressure output had risen to 187 million cu.ft., or 10½% of our total sales. Accelerated building schemes in hand and in prospect north of the City now call for more adequate relief. Consideration is therefore being given to schemes estimated to meet the requirements of the next 10 years. As our Mutley Main cannot be economically duplicated or enlarged, favourable consideration will be given to the claims of district storage. If freed from the burden of peak demands, our present distributing system would be ample for all ordinary requirements at more uniform pressure.

Another virtue of district storage—not always sufficiently stressed—is that it provides a safeguard against the possible loss of pressure control in the event, admittedly rare, of temporary failure of some unit of boosting or compressing plant during the time necessary to start up another machine.

High-Pressure System.

Our high-pressure system is supplied by four steam driven compressors, ranging in capacity from 47,000 to 120,000 cu.ft. per hour, and each district is laid out with the usual low-pressure mains fed *via* suitable governors installed in duplicate. These governors are no longer placed in pits, but in roomy houses above ground. The extra expense is well repaid by the ease with which inspection and maintenance can be carried out. The inlet to each governor is fitted with a dust trap furnished with a cylindrical felt filter, which has proved highly efficient in dealing with the dust which had previously caused some trouble, particularly in smaller governors passing gas at high velocity. Joints in our high-pressure mains are all of the welded sleeve type and tested to 80 lb. per sq.in., the work being carried out by our own men, who also make any specials required as the work proceeds.

Meters.

In regard to the important subject of meters, the high-capacity type was not slow in commending itself to us, and last year, profiting by the advice of the Meters Committee, we adopted the new small case size as standard.

of its kind to be put into service, we welcomed its introduction in something of a pioneer spirit. The power for effecting the necessary motions throughout the plant is hydraulic, its application being controlled by the electrically-driven auto operator. The equipment of this set with automatic operation, together with enlarged connections and higher blast pressures, has raised the daily production from 1¼ million to over 2 million cu.ft. per day.

As I have previously remarked, the automatic gear was the first of its kind to be put into service, and after the initial and inevitable "infantile complaints" had been surmounted, it has functioned with truly remarkable reliability and efficiency.

Auxiliary Plant.

To keep pace with the increased gas production plant, suitable additions have been made as opportunity offered, to our condensers, exhausters, washers, purifiers, power plant, and gas compressors, while two Connersville meters, each of a capacity of 7 to 8 million cu.ft. per day, were installed in 1930 to measure our coal and water gas makes.

Sulphate Plant.

In 1929 it was decided to complete an interrupted scheme for the modification of our neutral ammonium sulphate plant and to install a new deep enclosed type saturator. This, together with the neutralizing and drying apparatus, was supplied to us by the Chemical Engineering and Wilton's Patent Furnace Company, Ltd. The quality of the salt produced is excellent, the crystals being large, the acid content under 0·025% and moisture 0·04%.

A ready local market exists for the product, while a single operator can comfortably work the plant when producing *circa* 5 tons per diem.

The fact that all moving machinery operates at relatively low speeds tends to minimize the cost of upkeep, and though we do not look to the plant to furnish us with a fortune, it has, with the exception of two years, contributed a modest profit to our general revenue.

Gasholders.

With our house in order in regard to manufacturing and auxiliary plant, we were able to turn our attention to a sorely needed increase in gas storage. At the time, our storage capacity was approximately 3½ million cu.ft., and with a maximum output of 8½ million cu.ft. per day, and nearly 1 million cu.ft. per hour, the call for prompt action was imperative.

There being no room on the Works, a Board of Trade Order was obtained, scheduling an adjacent site in a disused limestone quarry for a new 5 million cu.ft., 4-lift, spirally-guided holder in a steel tank.

The construction of the holder, which was put into commission in 1933, exhibits no unusual features except, perhaps, that the whole of the gauge sheeting on the crown and sides of the lifts is in "Armco" iron. This feature, of course, added somewhat to the cost of the structure, but we believe it will prove justified by subsequent comparative immunity from corrosion.

Dehydration, Naphthalene Removal, and Benzole Recovery.

While the erection of the new holder was still in progress, a plant was laid down for the partial dehydration of our gas and the elimination of its naphthalene content.

The plant was supplied by Messrs. W. C. Holmes & Co., Ltd., and has a capacity of 10 million cu.ft. per day. It consists of two rotary brush washers for calcium chloride solution and wash oil, along with the necessary pumps, tanks, coolers, concentrator, and oil regeneration unit, which latter enables us to recover crude benzole to the extent of some 1½ gallons per ton of coal carbonized.

Incidentally the waste steam from the pumps is used to raise the temperature of the coal gas entering the main purifiers.

The combined plants function smoothly, require only a moderate amount of technical supervision, and have, with one exception, now happily passed, but upon which I propose to enlarge, led to a gratifying reduction in complaints from the district.

Filming Oil.

Before leaving the subject of dehydration, I should like to touch on the filming of the tank water inside our gasholders. Initially, we filmed with gas oil, but the destructive action on joints, seams, and general paintwork, particularly in the case of a new gasholder just put into service, rapidly convinced us of its unsuitability. Accordingly, when a reconditioned holder was put into commission in February, 1935, it was decided to use a special filming oil supplied to us by Messrs. Shell-Mex.

So far this oil has proved absolutely harmless to the paintwork, and, being in effect a light lubricating oil, it should have a definitely beneficial influence in inhibiting internal corrosion. Moreover, this special oil is highly efficient in its primary purpose of preventing contact between the dehydrated gas and the tank water, thanks, no doubt, to its strong surface tension, and though its initial cost is higher than that of gas oil, we believe that it will prove a sound investment in the long run.

Gum Formation.

For some little time past I have been struck by the comparative rarity of any press references to the question of gum trouble.

Following on the wide adoption of dehydration and naphthalene removal processes, gum formation, with its attendant derangement of thermostatic controls, by-passes, and the like, sprang into unenviable prominence, and was made the subject of exhaustive research.

The monumental labours of Fulweiler and his associates appeared to have established a definite link between gum formation and the presence of traces of oxides of nitrogen.

At Plymouth our combined dehydration, naphthalene removal, and benzole recovery plants ran for some while without our being troubled with gum. Ultimately, however, it made its first appearance on the inlet valves of a large Ingersoll Rand compressor, and then upon the valve of our 42-in. station governor, which had to be by-passed and cleaned at much more frequent intervals than usual.

That "it never rains but it pours" would appear to be an aphorism of particular application to gum troubles. While still grappling with our difficulties on the Works, reports started to reach us from the district of stuck thermostatic valves and choked by-passes. The cause of these failures was speedily established as gum formation, and the situation assumed a much more serious aspect.

We distribute some 30% of carburetted water gas, and supervision of the plant was intensified in a somewhat desperate hope of eliminating the oxides of nitrogen. At the same time the quantity of vaporizing oil which it is our practice to atomize into the mains on the outlets of holders was increased, but still the complaints continued.

The virtual end to our troubles was finally brought about with almost ludicrous ease. The gas oil which had now been in use for naphthalene removal and benzole recovery for nearly two years, with only sufficient additions to make up distillation and other losses, showed signs of sludging. Its absorption of naphthalene and benzole continued to be reasonably satisfactory, but trouble was experienced in cold weather due to the dissolved gums polymerizing and choking the cooling coils, and it was decided completely to renew it. With the introduction of the fresh oil came a sharp abatement of the gum troubles on the district, and within a couple of months they had to all intents and purposes disappeared. The deposits on the inlet valves of the compressor referred to, however, although somewhat less severe, continued to too serious an extent to be disregarded. Several remedies were tried without much success, but finally a small atomizer arranged on the inlet main, close up to the machine, and introducing small, regular quantities of a thin oil, which had been supplied to us for filming purposes, brought adequate relief. The deposits have not disappeared completely, but they are very greatly diminished and readily removed without injury to the valves, which can now safely run for six or eight weeks without attention.

Deposits on our station governor valve continue to some extent, but not such as to cause us anxiety or demand special action. I need hardly say that after these experiences it will be our practice to change the oil in our washer at much shorter intervals, say, nine to twelve months, or earlier should signs of polymerization ever occur.

I would not have it supposed that I am offering this as a panacea for all gum troubles. The subject is too complex and experiences too conflicting to permit of dogmatism, but I trust that, as an authentic record of what actually happened on our own Works, the account may not be without interest.

Safety Committee.

The total number of men employed on Works and Distribution Departments has risen from 417 in 1923 to 575 at the present time.

The safety of our workmen in the course of their occupation is a matter which, I am sure, is very near to the hearts of all of us. At Plymouth we have for some time past had a Safety Committee composed of our senior technical officers and foremen. This body meets monthly to discuss

staff. Large jobs, whether for gas or coke, are admittedly few and far between, but nothing is regarded as too small for careful consideration. Even where our work bears no immediate fruit, we feel that every effort made enhances our reputation for enterprise and resource and creates a feeling of confidence and goodwill, the cumulative effect of which should stand us in good stead in the years to come.

Showrooms and Cookery Demonstrations.

Our showrooms occupy an excellent position in the best shopping thoroughfare in the City, and it is our constant endeavour to display our goods in the most attractive manner possible. I may perhaps be pardoned if I suggest that the numerous prizes which we have secured in window-dressing competitions bear testimony to the skill and enthusiasm of our showrooms staff.

Cookery demonstrations at irregular intervals were superseded in 1933 by the appointment of a lady demonstrator, who gives at least two demonstrations weekly. We also run a series of evening demonstrations during the winter, catering for people unable to attend by day, and have found these greatly appreciated. Interest never seems to flag, and the seating capacity of our lecture hall is often fully occupied. The number of sales recorded after these demonstrations is also most gratifying. This lady also visits as many homes as possible in which thermostatically-controlled cookers have been installed, and I regard this as being her most important duty.

Canvassers and Travelling Showroom.

A staff of eight canvassers is permanently employed and reinforced each summer by selected fitters, a scheme which affords profitable occupation for the latter during the slackest season.

Fig. 2.—The Mobile Display Unit of the Plymouth and Stonehouse Company.

A travelling showroom was introduced last year and, apart from its excellent advertising value, has proved of great interest to our consumers and a real help to our canvassers, not only in the outer districts, but also, contrary to expectation, within the City itself. The body of this vehicle was constructed locally, to our design, upon a good second-hand 32 seater bus chassis—see fig. 2.

Electrical Competition.

In Plymouth we are faced with formidable competition from the Corporation-owned electrical undertaking, whose works are one of those selected to run from the Central Electricity Board's Grid.

With an increase last year of just over 14%, their annual output of current is about 40 million units. Expressed as therms, this represents one-sixth of my Company's output, or one-ninth of the total gas sold by the two Gas Undertakings operating in our City.

Their present charge for current is as follows:

Lighting	3·0d.	The average price realized is 1·65d. per unit.
Free wiring	3·0d. + 1¾d.	
Power, heating, and cooking .	0·85d.	
All-in supply	0·5d. + fixed charges	

Their Chief Engineer was recently reported to have said: "Before the institution of the grid, Plymouth had brought the cost of electricity so low that the grid can make no difference to it, at any rate for many years to come." If that is so, we at least know where we stand regarding price!

Cookers.

Up to the end of February the total number of electrical cookers which had, according to our Canvassers' reports, been placed in our area of supply was 378. Of these, 43 have been replaced by gas cookers, leaving a total of 335, a large proportion of which had resulted from a newly introduced system of simple hire. The number of gas cookers is over 41,000. However satisfactory, from our point of view, this comparison may be, we are more conscious than ever that no effort on our part must be spared to maintain, if not improve, the position we now hold.

Realizing that every house still harbouring a black cooker is fertile ground for the blandishments of our rival canvassers, a sustained effort is made by our representatives to be there first.

Our slot consumers, now numbering over 27,000, and increasing at a greater rate than our "ordinaries," called for special attention. The cost of replacing all their "blacks" free being greater than we could afford at present, my Board decided to offer a high-grade all-enamel cooker in exchange, and to cover the higher price and increased maintenance cost by a hire charge of 1s. 4d. per month, or 1s. 6d. if fitted with automatic oven heat controller.

The following particulars of this cooker may be of interest:

Oven Inside.			Door Opening.		Height to Top Plate.	Hotplate.			
Height	Width	Depth.	Height.	Width.		Width.	Depth.	No of Burners.	
								Grill.	Boiling.
In.	In.	In.	In.	In.	In.	In.	In.		
24	16½	12½	19	14½	36¾	22	21	1	3

The instantaneous and increasing demand for these cookers proved how ripe many of our slot consumers were for a change, and up to the end of February last, over 3,700 of the new pattern had been fixed since the inception of the scheme on May 1 of the previous year. Orders have now accelerated to the rate of over 160 per week.

I may add that the hire charge for an electric cooker of approximately equal capacity is 10s. per quarter.

Our experience, I believe, clearly indicates that the problem of the black cooker really calls for very serious consideration and prompt action.

Gas versus Electric Cooking.

Upon the question of cookers generally, it was decided that our canvassing staff could only speak with authority as to the economy of gas, if armed with incontrovertible facts obtained from practical experience.

We therefore equipped a test room, where meals could be cooked and general efficiency tests conducted on the latest gas cookers and corresponding appliances recommended by the local Electricity Department. The utensils used were of the same size, those used on the electric hotplate having machined bottoms.

The tests were conducted by a cookery expert trained in the use of both gas and electricity, and a chemist checked all weighings and scientific records. The weights of materials cooked in comparative tests were the same, and joints were cut from the same carcass to ensure uniformity in proportions of fat, &c.

Current was measured by a wattmeter certified by the N.P.L., while gas consumptions were recorded by a wet meter checked against a standard container and corrected to N.T.P.

The series of tests conducted, covering the use of oven and hotplate separately and in combination, provided most useful information, which was later passed on to our consumers by explanatory slips sent out with accounts, by newspaper advertisements, and by the canvassers personally.

Although our results corresponded very closely with others obtained by well-known authorities, the fact that they were "our" figures perceptibly increased our canvassers' confidence in using them. One of the greatest benefits derived from this work lay in our ability to offer any doubtful person a special demonstration, covering any menu they might choose, at our expense. Few troubled to accept, but all appeared convinced of our ability to prove our statements.

Water Heating and Lighting.

Needless to say, the water heating load is one of the many receiving our unremitting attention. The results so far obtained are gratifying, particularly in the case of owners of new property, who appear to appreciate the

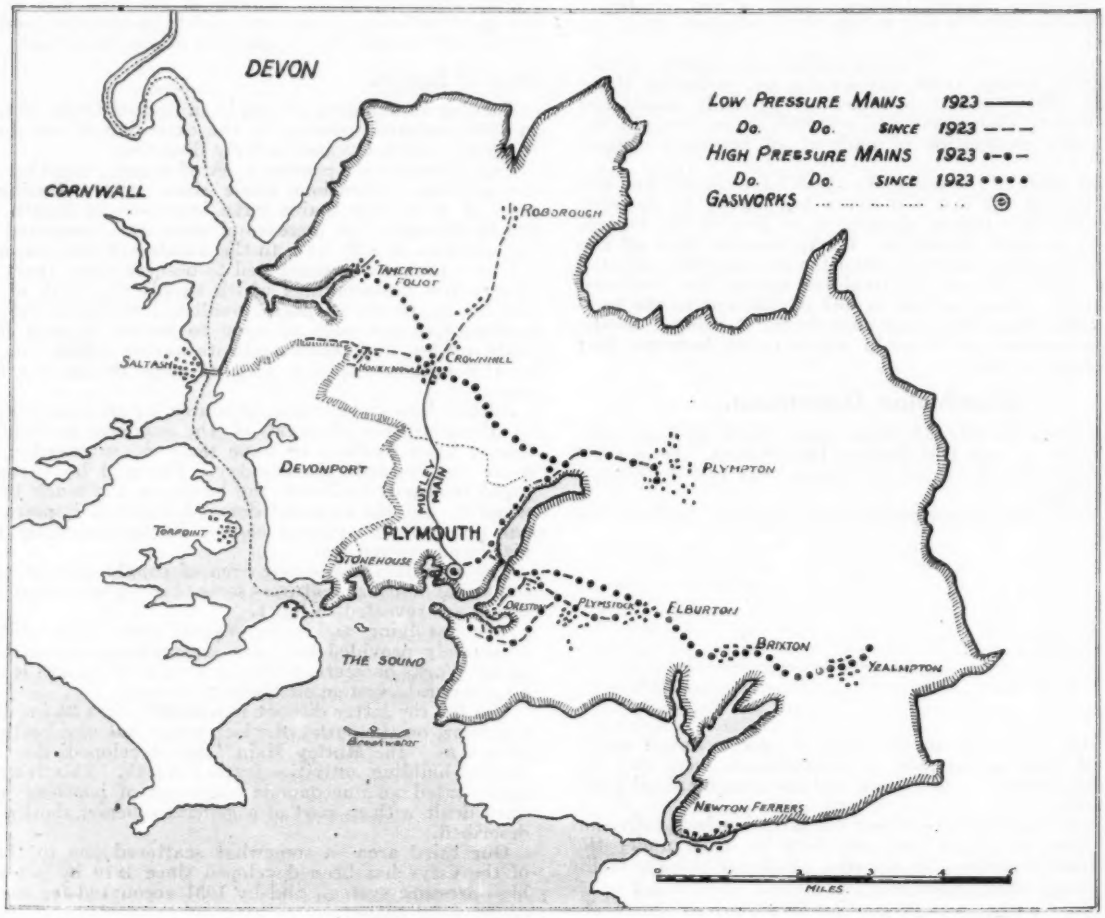


Fig. 1.—Area of Supply of the Plymouth and Stonehouse Company

I am happy to learn of the general favour which this type of meter is finding, and can certainly testify to its popularity among our own consumers.

Partial dehydration and the elimination of naphthalene from our gas have effected a marked improvement in the internal condition of our meters, but changes in the types purchased since these processes were introduced have made it impossible to equate such advantage to a financial basis.

District Syphons.

Our district syphons, although now practically dry, are visited periodically and any small amount of condensate withdrawn into a vacuum tank *via* a glass container which enables both its volume and nature to be observed. This outfit, operated by an oil-cooled motor cycle engine, was made up on our Works and mounted on a simple frame for easy transport by any spare lorry.

Choked Services.

Choked service pipes are happily becoming comparatively rare, but as far as practicable such as are encountered are dealt with by a motor cycle vacuum service cleanser, a device of such proved merit as to require no further eulogy in these notes.

Emergency Van.

An important feature of our district organization is the night emergency van. This vehicle is stationed in the Works yard every night, fully equipped with batteries, electric lights, gas masks, leak indicators, and general tools, and can leave for any part of the district at a moment's notice. In case of need, it is driven by one of two men on telephone duty, who picks up the necessary workmen from their homes, drives them to the job, and returns to the Works to reload with fresh equipment.

Fusion.

Before leaving this section I feel bound to refer to the definitely increasing danger of fire and explosion arising from the complementary use of gas and electricity in dwelling houses.

Shoddy wiring by contractors and the extension of circuits by amateurs are the chief contributory causes, but there are others, and had time permitted I should have quoted a few examples taken from about 70 proved cases of fusion in our area during the past five years.

I am happy to say that we enjoy the cordial co-operation of the Electricity Department Staff, both in determining the cause of trouble and in the application of preventive measures whenever we have to report dangerous conditions.

Apart from our local efforts to meet the menace of fusion, many lectures on the subject have been given in various parts of England by a member of my staff, Mr. H. C. Widlake. These have been given with the aid of a model, in which the various conditions contributory to fusion are produced and can be clearly observed and studied.

It is a significant fact that whenever these lectures have been given, the nature of the questions put to the lecturer show that escapes and fires due to fusion are no less prevalent in other districts than in Plymouth. Personally I am inclined to doubt whether the gravity of the position is fully realized, and would like to suggest that this subject be included in the education syllabus, so that the rising generation of supply engineers and gas fitters can be thoroughly conversant with the conditions they will frequently meet in the course of their work.

Sales Policy.

Under the able and enthusiastic direction of our Managing Director, this Department has seen the greatest change of any.

Realizing that the Showrooms Manager and existing staff were fully occupied within the building, a man of sound technical training and invested with wide authority was appointed as Sales and Technical Representative to take full charge. Although our area is mainly residential, and only about 3% of our gas is used for industrial purposes, it was felt that extended use of gas could be encouraged in business premises generally.

This was soon confirmed by the increased orders and enquiries received, while the numerous problems which arose necessitated still further additions to the technical

luxury of hot water on tap to a greater extent than do those living in older houses.

In regard to lighting, the position is, unhappily, less satisfactory, and despite all efforts, our competitors are steadily gaining ground. Our responsibility for street lighting ends with the supply of gas, and all efforts to regain control of the fittings and maintenance have failed. The City Council's policy is definitely to transfer the lighting of the principal thoroughfares to their own electricity undertaking, and during the past four years we have lost about one-quarter of this load.

Recent pronouncements of the Ministry of Transport indicate the recognition of improved artificial lighting of our highways as a means of reducing the present deplorable number of road accidents.

It is sincerely to be hoped that while the matter is under review the paramount importance of continuity of supply will not be overlooked, and that the claims of gas in this respect may secure for it at least some share of the prospective load.

Although maintaining our efforts and taking every opportunity of showing the most modern fittings, private lighting by gas shows accelerated decline. Concerning this, we feel that having honestly presented the case for gas, the final choice must be left with the consumer. Here again, without discussing the relative merits of gas and electric lighting, there is much to be said in favour of a second string to one's bow.

The menace of air raids is now an openly discussed possibility, and should it materialize, with the destruction of one form of illuminant, the possible survival of a second would prove of inestimable value.

Price of Gas.

In 1923 the price charged for gas to ordinary consumers was reduced from 8d. to 6·5d. per therm. After rising to 9d. in 1926 it gradually fell to 6d. and remained at this figure from 1928 to 1933. During this period the varied arguments for and against the many schemes of promotional charges were carefully considered. Our choice was limited by circumstances, but realizing that it would be impolitic to wait any longer, my Board decided to adopt the following scale of charges.

[Up to and including the first 5,000 cu.ft. only of the total consumption for the quarter at 7½d. per therm (2s. 9¾d. per 1,000 cu ft.).]

		Cu.Ft.		Cu.Ft.		Approx. per 1,000 Cu.Ft. s. d.
Scale A.	Over	5,000	and up to	20,000 at 6½d.	per therm	2 4½
,, B.	,,	20,000	,,	50,000 ,, 6 d.	,,	2 3
,, C.	,,	50,000	,,	100,000 ,, 5¾d.	,,	2 2
,, D.	,,	100,000	,,	250,000 ,, 5½d.	,,	1 11¾
,, E.	,,	250,000	,,	500,000 ,, 5 d.	,,	1 10½
,, F.	,,	500,000	,,	1,000,000 ,, 4½d.	,,	1 8¼
,, G.	,,	1,000,000	,,	1,500,000 ,, 4¼d.	,,	1 7¼
,, H.	,,	1,500,000	,,	2,000,000 ,, 4 d.	,,	1 6

Where gas is required in excess of 2 million cu.ft. per quarter the same will be supplied by special contract, the terms of which will be fixed in accordance with the estimated maximum hourly and daily demand and the circumstances in which such gas is required.

The above charges apply to gas consumed on premises under one roof or connected and are for prompt payment.

Outlying Districts.

As hitherto, the following additional charges per therm will be made to all those quoted above:

Brixton and Yealmpton	2d. per therm additional
All other outlying districts . . .	1½d. ,, ,,

These were put into effect in December, 1933, and although offering no great inducement to a large number of our consumers to extend the use of gas, it proved far better than the old flat rate. We are convinced that it was not only the means of procuring fresh business, but of maintaining some that we previously ran the risk of losing.

Much more could be said under this interesting heading, but my colleague responsible for our Sales Department, as this year's President of the Western Juniors, will no doubt deal with this subject in greater detail in his own Address.

Conclusion.

Before concluding, I would like to take this opportunity of expressing my personal pleasure at the tendency towards what I may call "levelling up," which is now apparent throughout our Industry.

The technical management and maintenance of our Works must always occupy a front rank position in the general scheme of things, but it should not be such as to obscure or even overshadow the equally necessary activities of other departments, whose services should be adequately recognized and rewarded.

A belief in the future prosperity of our great Industry, the seventh largest in the country, is, by itself, not enough. I believe that success can best be achieved by a policy aiming at the highest possible efficiency in each department, with a cordial team spirit pervading the whole.

Men with the necessary enthusiasm and knowledge are not lacking and, given the encouragement of such a policy, increasing prosperity should be assured. Fortunately local effort can always rely upon the invaluable help of our National Bodies, the Institution, and various Associations for both Senior and Junior members; also last, but by no means least, our very able and live Technical Press.

Vote of Thanks.

Mr. P. S. Hoyte, before proceeding to the task allotted to him of proposing a vote of thanks to Mr. Clark for his Presidential Address, remarked how very happy he was to be present again at a General Meeting of the Southern Association of Gas Engineers and Managers. Those of them who knew of the long association between Mr. Clark and himself must realize with what pride and pleasure he was there that day to propose a vote of thanks to him for his Address. Mr. Clark came to him thirty-three years ago as his first pupil; they had stuck together ever since, and he would do his best to maintain that Association. If anything could have pleased him more than to hear that Mr. Clark had succeeded him at Plymouth, it was to see him in the Presidential Chair of the Southern Association that day. Mr. Hoyte went on to say how happy he was to see some present on that occasion who were associated with him during his year of office as President. He wished that everyone there—when the time came for him to lay down the cares and joys of office—might be succeeded by as capable a man as he had been in Mr. Clark, and that they would look on with as grateful and appreciative an eye, as he had done, on the capable way in which he had carried on the duties of Engineer of the Plymouth Gas Company.

Mr. R. Robertson (Bristol), in seconding the vote of thanks, most heartily endorsed the appreciative sentiments expressed by Mr. Hoyte. As a West Country man himself he was happy to have a neighbour who had acquitted himself so well. The Address had been an admirable one in that it had taken the form of a description of the problems their President had had to deal with in his Undertaking. The pooling of such information was one of the happiest features of their Industry and the secret of its progress and success. Mr. Clark's contribution had been very valuable, dealing with a wide range of practical problems concerning both manufacturing and distribution practice. Another feature was that it formed a sequel to Mr. Hoyte's Presidential Address to them thirty years ago —when the latter put Plymouth on the map as a progressive undertaking. That sequel was eminently satisfactory in every way, and they all looked forward with great pleasure to visiting Plymouth in June to see the changes which had taken place during the thirty years which had elapsed. Mr. Robertson observed that he could appreciate that not least of Mr. Hoyte's achievements had been that he was able to introduce so competent an Engineer and President as Mr. Clark. Their President's Address had dealt with all the various items so lucidly that there was no room for discussion or criticism, and the only reaction was one of great appreciation, which had already been very well expressed by Mr. Hoyte. He had the greatest pleasure in seconding the vote of thanks.

The President, in acknowledging the vote of thanks, which was very heartily accorded, said that he was extremely grateful to the proposer and seconder for their very kind remarks and to all the members for the way in which they had received his Address. The excellent foundations for which Mr. Hoyte had been responsible had made any extension work on his part both easy and pleasant, and he would like to take this opportunity of acknowledging his indebtedness to Mr. Hoyte for the help and consideration he had invariably shown him throughout his professional career. In conclusion, the President reminded the members of the forthcoming visit to Plymouth on June 30. If they could add, he remarked, to the pleasure they had already given him in putting him in this position, it would be by coming to Plymouth and giving himself and the Company he represented the pleasure of entertaining them there.

The Modern "Ideal Home" Relies More and More on the Services of Gas

Gas once again has an excellent "stage" at the *Daily Mail* Ideal Home Exhibition at Olympia, and, thanks to the efforts of all concerned, its story is put across in a most convincing way.

FINE DISPLAYS BY LEADING MANUFACTURERS

MANY NEW APPLIANCES INTRODUCED

GAS FINDS ITS PLACE IN THE MODEL HOMES

The "Daily Mail" Ideal Home Exhibition, recognized as the most popular and comprehensive domestic exhibition organized for the British public, provides probably the finest opportunity in the year for the Gas Industry to show that same British public just how it is keeping abreast of the times in the provision of all the more essential domestic services. It is, moreover, of further interest to the "gas-man" by reason of the fact that many new and improved appliances are to be seen for the first time on the stands of various manufacturers.

It is difficult in the space at our disposal to deal by any means fully with the splendid displays of many of the gas exhibitors; but an endeavour has been made to give in the following pages an impression, however inadequate, of the various stands with particular reference to novel exhibits to be seen thereon.

The display of past years organized by what was known as the London Gas Exhibit Committee—which embraced the majority of the London Gas Companies—has disappeared from Olympia on this occasion; and this year the Gas Light and Coke Company holds the fort alone. It should not, however, be assumed that the display is any the less effective on that account, for the world's largest gas company has put up a very comprehensive exhibit, covering every phase of domestic gas service.

There is a special display of gas refrigerators grouped around a striking centrepiece, and among the various domestic cabinets is a new large size model (the LJP), which has a shelf area of 9·8 sq.ft. and an average gas consumption of 2 cu.ft. per hour. The total internal capacity is approximately 5½ cu.ft. Examples are also demonstrated of the various gas water heaters which the Company are adopting in their present water heating campaign. A range of these is set up over a common trough, effectively illuminated, while a thermometer registers the temperature of the discharge water from the heaters at a steady 120° F. Coloured enamel cookers, gas fires in many pleasing finishes, and a display of all the smaller gadgets which can be "plugged in to gas" make an imposing exhibit. The gas lighting of the stand is particularly noteworthy, the new pendant fittings being especially attractive, while the new designs of standard and table lamps strike a modern note. At one end of the stand is a small section where cookery demonstrations are carried on with the help of a gas cooker specially constructed with a glass back so that the public may see the food in process of cooking.

Benham & Sons, Ltd., have a display of their stainless steel kitchen equipment.

New "Portcullis" Models.

Among a number of very pleasing "Portcullis" gas fire settings on the stand of Bratt Colbran, Ltd., are two new appliances by this well-known firm. The "Mortimer" portable heater is a definite advance on the previous convector model in that it produces radiant in addition to convected heat. One or two radiant units are incorporated in the heater, in the case of the latter each unit being independently controlled. The gas supply is governed to a low pressure, the consumption being 10 cu.ft. per unit. The appliance is of sufficiently light construction to be moved from room to room if desired, though probably its widest application is for hall heating. The "Mortimer" is simple and well suited to modern styles of furnishing, while it is available in a number of coloured finishes.

Another innovation in the "Portcullis" range is the production of the new "Martello" model, which has been designed in response to a widely felt demand for a *panel* fire incorporating a boiling ring. In the bedroom of the flat, hotel, and private house, the "Martello" fire will meet the requirements of many who wish for a panel gas heating unit equipped with a small burner on which a kettle or saucepan can be heated. The "Martello," which is made in the 3-unit and 4-unit size, the latter being fitted with a duplex burner, retains the architectural character of the popular "Portello" model, the height having been increased to include the panel behind which the boiling ring is concealed when not in use.

Crane, Ltd., display their well-known "Whitehall" and "Carlton" sectional heating boilers, together with their "Regent" round boilers and "Ipswich" series for domestic hot water. New exhibits include the "Carlton" heating boilers with open fire-front and "O.O." "Ipswich" boilers designed to provide adequate hot water for small dwellings at very low cost. Grouped with these boilers are Crane (shielded) "Pall Mall" hospital and wall radiators in various types and sizes. Malleable fittings and valves are also shown.

On the stand of the Eagle Range & Grate Company, Ltd. (Radiation Ltd., Proprietors) is a comprehensive display of Eagle combination grates, coke ranges, and gas-coke grates. Special attention is drawn to the new Eagle coke range—an appliance designed for boarding-houses and large establishments. Various other types of large-scale cooking apparatus are shown in operation, while a wide variety of gas-coke grates are also on view, including a damper grate that can be controlled to give a fire of varying intensity.

Electrolux, Ltd., devote a special stand to the display of gas-operated refrigerators, including all the most popular domestic models.

A Pleasing Display by Flavel.

A Display of Water Heaters.

A very fine display of gas water heaters is to be seen on the stand of Ewart & Son, Ltd. A feature is made of the "Califont-de-Luxe" multi-point machine, which embodies a new departure in construction, occupies very little space, and provides a continuous hot water service instantly at all points. A safety cut-off device is incorporated, and the heating capacity is stated to be 3½ gallons per minute, raised 40° F. To obtain the full flow 20 ft. head is required. The heater is attractively finished in white porcelain enamel. Another multi-point model at less cost is the "Vivo," while single-point heaters such

as the "Victor" and "Oto" bath geysers and "New Brilliant" sink or basin model are also shown, all with porcelain enamelled casings. The firm are also displaying porcelain enamelled cast-iron baths and lavatory basins in white and coloured finishes.

On the stand of Sidney Flavel & Co., Ltd., cookery demonstrations are carried on with the firm's latest type of gas cooker—the "Kabineat-de-Luxe." Models of their new "Babette" cooker are also shown, while practical demonstrations of the "Paradise" gas griller testify to the merits of this useful appliance. The "Flavel Elf" is another interesting appliance which has been produced in collaboration with the South Metropolitan Gas Company. This useful cooker, which is described in detail on another page of this issue, can be fixed directly on to the wall, thus freeing valuable floor space. The firm's radiators, panel heaters, and coke grates complete an effective display.

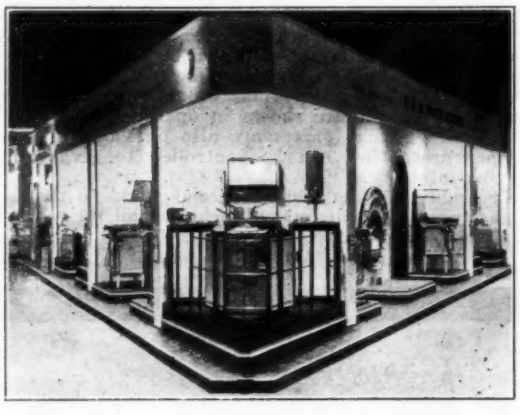
An exhibit of "Ideal" products, including domestic boilers for hot water supply, gas boilers and radiators for central heating, and "Rayrad" radiators, is to be seen on the stand of Ideal Boilers and Radiators, Ltd. For cooking, warmth, and hot water supply the No. 21 "Ideal Cookanheat" is shown, while the No. 34 model gives the advantages of an independent boiler with full cooking facilities by gas, coke, or coal. Towel rails and other "Ideal" accessories complete this display.

A Coke Exhibit.

The growing appreciation by the public of the advantages of gas coke for domestic and industrial purposes is reflected in the excellent display of the London and Counties Coke Association. Approved designs of open coke grate are shown in operation, including models by such well-known firms as Brockhouse, SoFono, Flavel, Kempton, and Eagle Range. All these are, of course, fitted with gas ignition. A coke grate which has only recently been adapted for gas ignition is the "Very," which is produced by the Coalbrookdale Company, Ltd.

A display cabinet contains grades of coke, while on another section of the exhibit are a number of domestic coke boilers—one in a very attractive enamel finish of green and primrose. The thermostatic control of larger boilers is also demonstrated, while a section of the stand is set aside for publicity, examples of the Association's new showcards and other literature being prominently displayed. Reference to the Association's publicity scheme is made elsewhere in this issue.

R. & A. Main, Ltd., have a comprehensive exhibit, tastefully set out and enhanced by a colourful display of gas appliances. Among many of their well-known appliances



A Corner of Main's Attractive Stand.

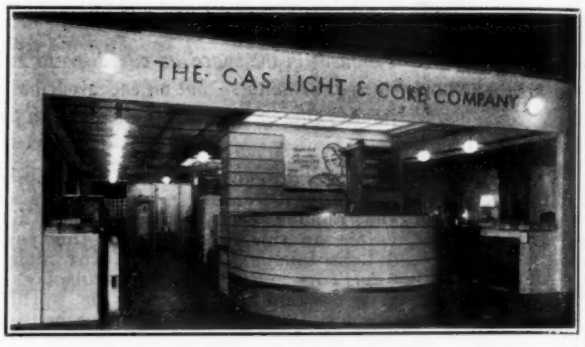
there are a number of interesting new features. For instance, the "G.L.C." circulator, which the firm manufacture for the Gas Light and Coke Company, is shown, together with the "Prestot," a neat little instantaneous sink water heater in white, green, or blue enamel finishes. A novel accessory for attachment to the gas cooker or for independent use is the "P.R." hotcloset for heating plates or keeping cooked food warm. The hotcloset is strongly constructed with cast-iron end frames and sheet metal body. The exterior is finished in high-class vitreous enamel. The door is of the drop-down type and is enamelled and fitted with a Bakelite knob. The interior is finished in black vitreous enamel, and is supplied with a loose removable grid capable of accommodating 11 plates. The hotcloset is heated by a luminous burner of very small gas consumption—costing only 1d. for 5 hrs. heating.

Another innovation by R. & A. Main is the switch control of their latest portable gas fires. The control is conveniently placed at the top of the frame, thus obviating bending down; and, operated from a small electric battery, a by-pass is concealed in the side of the fire half-way up. This by-pass is only alight at the actual moment of ignition. Examples of the firm's small panel gas fire are also shown, this constituting a neat, efficient, and inexpensive setting of attractive appearance.

New Storage Water Heater.

A new quick-recovery storage water heater—known as the "Instor"—is shown by New Geysers, Ltd. This is manufactured in three sizes—namely, 11, 15, and 20 gallons—and the machine is stated to heat up again after a substantial draw-off in as few as 15 minutes. It is automatically controlled by means of a thermostat which operates a pilot jet playing on a bi-metallic strip. The firm also exhibit their "Autofont" multi-point heater, together with a range of single-point models in attractive coloured finishes. One of these is demonstrating the application of Calor Gas, for the use of which the firm have supplied a number of heaters.

Once again the Potato Marketing Board are demonstrating the many tasty ways in which potatoes can be prepared, and for this purpose they are using the all white enamelled "Calthorpe" gas range by the Parkinson Stove Company.



A View of the Gas Light and Coke Company's Exhibit.

One of the special features of the exhibit of Thomas Potterton (Heating Engineers), Ltd., this year is the No. 3 Series "Rex" boiler for large systems of central heating. This new series embodies the outstanding features of design contained in the Nos. 1 and 2 series, and increases the range of capacities up to 1,250,000 B.Th.U. per hour. Freedom from condensation within the flueways, combined with low maintenance cost and continuity of efficiency are special features. They are silent in operation and work under natural draught conditions within the boiler, therefore requiring no forced draught or chimney pull, and the flue baffler incorporated in the construction isolates the flame from the chimney and external conditions. The boiler is constructed with each section in two halves so that a complete set of sections of each half of the boiler can be delivered assembled, yet pass through narrow doorways. Thermostatic control is obtained by water temperature through a relay valve from a small-bore immersion thermostat; and auto cut-outs, remote air-temperature, control and clock controls can also be applied. The portholes are of 4 in. diameter; and as there are two flow and two return openings to each boiler, it enables them to be used in units up to 10 sections. The waterway is lagged and cased, while the special cover forms a baffler, and flues can be taken direct to chimneys or externally without any other anti-downblow fitting. Ordinarily this boiler is supplied in painted finish, but can be enamelled to order.

Among other Potterton exhibits is a working example of gas-fired central heating, by a 2-section "Rex" boiler with "Ideal" radiators on an overhead circulation as for a single-storey building. The system is fully equipped with remote control and time switch, while the boiler is also fitted with automatic cut-out in case of flame failure. The firm's new "Spiral" boiler is also exhibited for the first time. this being suitable for greenhouses or small systems of low-pressure hot water heating up to, say, 50 sq.ft. heating surface. When used for the latter purpose it is entirely lagged and enclosed in an external metal casing. The stand is lighted by gas with "Nico" torch brackets, the work having been carried out with the co-operation of the Gas Light and Coke Company.

Radiation Stand.

On the Radiation stand, cookery demonstrations are the main attraction for women visitors, as a series of delicious meals are being cooked in the oven without

attention, the door being padlocked and sealed meanwhile. Radiation have greatly extended their range of these simultaneous whole-dinners, and have also developed automatic cooking in other practical directions.

In connection with the Cookery Demonstrations, there will be a choice of "New World" cookers and ranges on view. Particular attention is drawn to the new colour finishes carried out in hard porcelain enamel. These "Beau" finishes, as they are called, consist of two carefully-harmonized colours, differing in each of the Radiation manufacturers' models, and together they cover all the possible requirements of the most modern kitchens.

A Section of the Radiation Exhibit.

The High "Beam" gas fire, which is a standard Radiation appliance, has many new features. First of all, it is self-lighting, no matches being needed. Another special point is that the radiants cover the whole of the fire opening. Again, the canopy, or hood, which is really an undesirable legacy from the old-fashioned coal grate, has been entirely eliminated in this new fire. The ever-popular "Sunbeam" gas fire is also to be seen.

Large water heaters capable of taking care of the whole requirements of the household are to be seen in actual working conditions, and also the smaller models that are useful for ready supplies of hot water to sink, lavatory basin, &c. In each case the working is entirely automatic, the gas being cut down so soon as the water is heated. So far as exterior finish is concerned, these water heaters together are an object lesson in what can be done to brighten the modern kitchen and bathroom. Examples of instantaneous water heaters are also to be seen on this stand.

Altogether, the exhibit of Radiation Ltd. this year is a striking tribute to the great forward strides that have been made in the production of gas appliances.

R. Russell & Sons, Ltd., are exhibiting their well-known "New Herald" gas combination. This consists of an automatically regulated gas oven, a hotplate with boiling burners and griller, a gas fire for warming the room, and a gas heated circulating boiler, automatically regulated, for supplying hot water to taps for domestic purposes—all self-contained in one gas-heated unit.

A useful accessory for the coke user is to be found in an exhibit by Dr. M. C. G. Schwabach. This is a suitably shaped coke storage box (made in sizes to hold from 3½ cwt. to 2 tons) at the outlet of which is a channel, always filled with coke, into which a specially shaped scoop, shovel, or small scuttle exactly fits—thus scooping up a full receptacle of coke in one movement, in the case of the scuttle, 10 lb.

Attractive Lighting Fittings.

A wide selection of modern lighting fittings, finished in chromium plating and coloured enamel, are displayed by Stoves, Ltd., in conjunction with Falk, Stadelmann, & Co., Ltd. A most attractive fitting is the "Saturnlite" pendant, examples of which are to be seen illuminating the stand of the Gas Light and Coke Company. This fitting comprises an opal globe suspended on a chromium-plated pendant; and round the centre of the globe, like the "rings" around the planet from which it takes its name, is an annular shaped plate of glass with alternating strips clear and frosted, thus making a very effective design. A number of gas fires in coloured finishes are also shown on this stand, together with a range of portable heaters. Some very attractive coloured cookers are displayed, a new feature being the automatic lighter. This device is actuated on the flint and steel principle, operated by the turning of a knob in a similar way to that which lights their "Silo-Matchless" fires. This ignites the gas jet at the end of a flexible tube, long enough to reach the farthest burner. A safety device is incorporated so that the lighter cannot be replaced in its holder until the gas is turned off.

The Vulcan Stove Company are exhibiting a range of gas cookers, including cookers fitted with the Vulcan patent glass door, the glass of which is claimed to be both fireproof and unbreakable, and the patent construction maintains perfect insulation and prevents steaming over. The cookers are also fitted with automatic temperature control, and are shown in different coloured and mottled porcelain enamelled finishes. Also shown are various types of gas fires, including "Gip" fire units and portable gas fires.

In connection with this firm's new range of cookers—which, by the way, are produced in a variety of pleasing colour finishes—it is interesting to note an innovation in oven burner design. On the latest models the burner is set at the back and divided into two separate sections; in other words, there is a gap of three or four inches in the centre, which is stated to be advantageous as regards circulation of the heat. A useful baking tin is part of the standard equipment of the firm's cookers, this pan being perforated between each section to allow of better heat contact with the cakes. The Vulcan multi boiling-plate is also shown on this stand.

Gas in the Model Homes.

Excellent work has been put in by the Gas Light and Coke Company in connection with the installation of gas appliances in the model houses and flats. Several of these reproductions of the present-day model home are well equipped with such gas appliances as fires, cookers, multi-point water heaters, refrigerators, and others, providing a splendid testimony to the growing regard in which gas is held for the essential domestic services in the home of to-day.

An Attractive Gas Fire Display on the Stand of the Gas Light and Coke Company.

Even the much talked-of rooms of the film stars, which are proving such a popular attraction at Olympia, are not without a boost for gas. Whatever the public may think about the lighting of Mae West's bedroom, the fact remains that the reproduction of Leslie Howard's kitchen shows that this well-known actor's wife appreciates the value of gas for cooking. She uses, apparently, a Flavel cooker in stainless steel finish, which looks very effective in its modern setting.

Successful Cookery Demonstrations at Cork

Large Attendances Recorded

A series of cookery demonstrations was recently arranged by the Cork Gas Consumers' Company in the Father Matthew Hall, Queen Street, and despite the omission of two demonstrations (the period including Saint Patrick's Day), the aggregate attendance at these lectures for the ten days on which they were held reached eight thousand persons.

Mrs. E. Hardy (of the Radiation Research Kitchen) was the Lecturess, and interesting and practical dishes were demonstrated, including two and three course dinners cooked in the "New World" oven without attention. In addition a cake-baking competition was organized and proved a great success—as many as 192 cakes being entered.

LONG SERVICE TO THE GAS INDUSTRY

A number of firms of long standing on the contracting and manufacturing side of the industry have collaborated with the "JOURNAL" in the production of a series of articles, under the above title.

Clapham Brothers, Ltd.

In 1837, the year which saw the beginning of Queen Victoria's long and glorious reign, a firm of ironfounders was started in Keighley by three brothers—John, Thomas, and William Clapham. The firm flourished and grew continuously for fifty-six years without any change from its original title of Clapham Brothers, until, on the retirement of John Clapham in 1893, it was converted into a limited liability company. It was Thomas, the second brother, who devoted himself to the development of the gas plant side of the business until his death in 1899, and the family connection has been carried on unbroken to this day, when his son, W. S. Clapham, and his grandson, T. Alborn Clapham, are respectively Chairman and Managing Director.

The early activities of the firm are somewhat obscure, but investigation of old records has indicated that between the years 1837-1853 these included the manufacture and sale of castings, pipes, and purifiers. After this few details are available until 1878, when records show that a set of six purifiers, each 30 ft. by 24 ft., was supplied to the Bradford Corporation. This was the beginning of a big connection, and by 1887 no fewer than forty-two purifiers had been delivered to Bradford alone, and large contracts had been carried out for Southport, Stretford, and Lincoln Corporations.

During these years of growth three foundries were operating under the Clapham ægis—Wellington Foundry for gas-works plant; Nelson Foundry for the manufacture of vertically cast socket and spigot pipes from 3 in. to 24 in. diameter; and Market Foundry for light castings. All three continued operations until 1912, when the vertical pipe casting plant was closed down and Nelson Foundry converted into a general foundry for gas-works plant. Since that time it has been extended twice; five overhead electric travelling cranes have been installed, and in 1927 a new pattern store 120 ft. by 80 ft. was built, two storeys high, for storage on modern lines of the patterns in use.

"Eclipse" Rotary Washer-Scrubber.

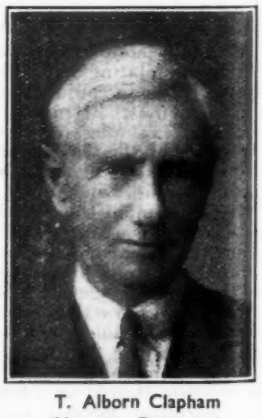
The year 1881—an eventful one in the history of the firm—saw the appearance of the first Laycock and Clapham patent "Eclipse" rotary washer scrubber, and following its adoption by many undertakings at home, a flow of orders from countries all over the world brought the total before long to the two-hundred mark. A world-wide sale was also achieved by other introductions by this pioneering firm, the first vertical water tube condenser, erected at Lincoln in 1884, and the introduction of the "Eclipse" patent vertical tube condenser in 1896, preluding the erection of some 250 of these Clapham products in various quarters of the globe.

One of the prized recognitions accorded to these achievements was a silver medal gained at the International Inventions Exhibition in 1885, for a collective gas-works plant exhibit; this, incidentally, including the original rack and worm gas valve of which Clapham Brothers were the original sponsors. Even in these comparatively early years a notable feature of the firm's activities was the diversity of its products. One of the most interesting examples of a speciality job was the revolving observatory roof, designed and erected in 1886 for the late Mr. E. Crossley, of Bermerside, Halifax. The dome was fitted with the usual rotating gear and sliding roof, and originally housed Mr. Crossley's 36-in. reflector, which was subsequently presented to the Lick Observatory, Mt. Hamilton, California.

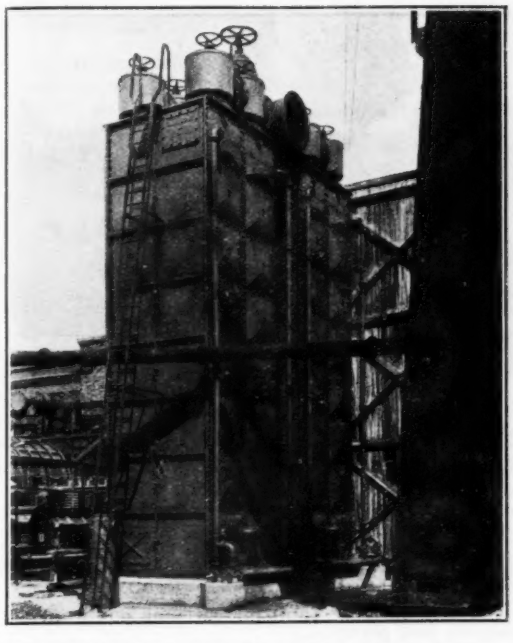
Another successful product of this era was the patent "Eclipse" rubber joint and automatic fastener for purifier covers, introduced in 1899, which, although the patent expired in 1913, has seen during the last decade a yearly sales increase of over 300%—a fact which would seem to emphasize the continual research and care in manufacture contributing to the extraordinary service of this joint. The early Nineteen-hundreds saw further progress with the introduction of the patent reversible condenser, patent P. & A. tar extractor, and "Triumph" purifier valve,

W. S. Clapham
(Chairman).

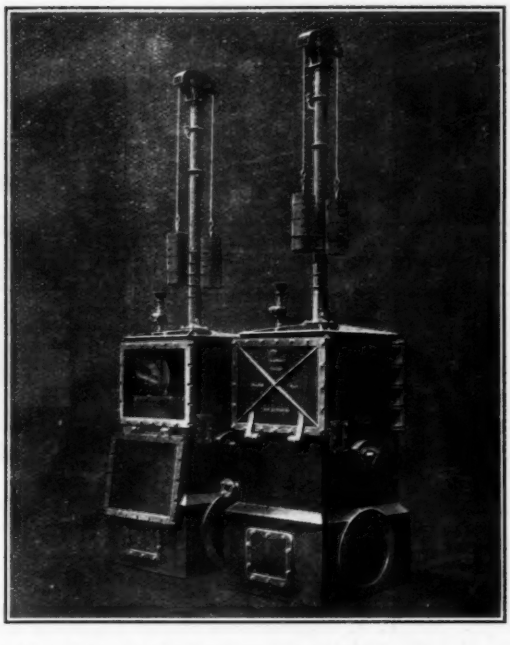
The Three Founders of the Firm—John, Thomas, and William Clapham.



T. Alborn Clapham
(Managing-Director.)



"Eclipse" High Efficiency Horizontal Tube Condensers—capacity 8 million cu.ft. per day, erected at the Nine Elms Works of the Gas Light and Coke Company.

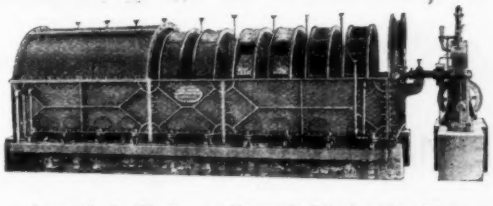


"Eclipse" P. & A. Tar Extractor, each 5 million cu.ft. per day capacity, supplied to the Wandsworth Gas Company.

while condensers of the high efficiency type were first erected at Antwerp in 1908, to be followed by a further set in 1914. Incidentally, from this condenser was eventually evolved the present well-known horizontal tube condenser, of which two sets each of four million capacity are here illustrated.

The War Period.

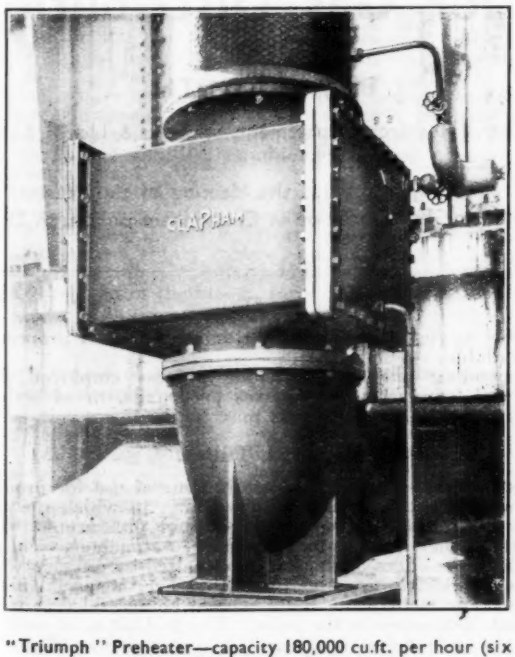
In the early days of the war the Company's works, like those of so many other firms, became a Controlled Establishment, and from then until the Armistice were engaged on Ministry of Munitions and Admiralty work. But these unfortunate years brought in their train a more directly unfortunate loss in the deaths, all in the year 1915, of three sons of original founders—S. B. Clapham, who was at the time Chairman of the firm, a son of Thomas, and Thomas S. and Walker Clapham, sons of William. Incidentally, Thomas S. Clapham had been Chairman of the Society of British Gas Industries in the fourth year of its existence. So great a misfortune might have meant serious calamity to a less progressive firm, but, still forging ahead, Clapham Brothers came successfully through the war years and their aftermath, and in 1921 achieved their largest single contract, which was executed at the Provan Works of the Glasgow Corporation. This contract, the price of which was over £100,000, included a wet purification plant with capacity of 18 million cu.ft. per day,



Laycock & Clapham "Eclipse" Washer Scrubber.

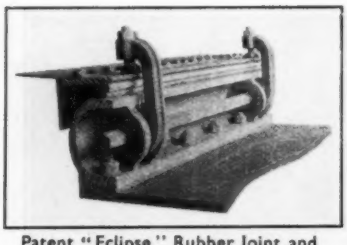
volumetric governors, P. & A. tar extractors, water tube condensers, Livesey washers, vertical and horizontal washer scrubbers, overhead connecting mains, valves, and incidental equipment.

The same year, 1921, saw another notable extension of activity, Clapham Brothers becoming interested in Keighley Laboratories, Ltd., a firm of consulting metallurgists with

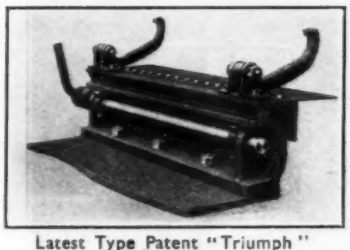


"Triumph" Preheater—capacity 180,000 cu.ft. per hour (six supplied to Birmingham Corporation).

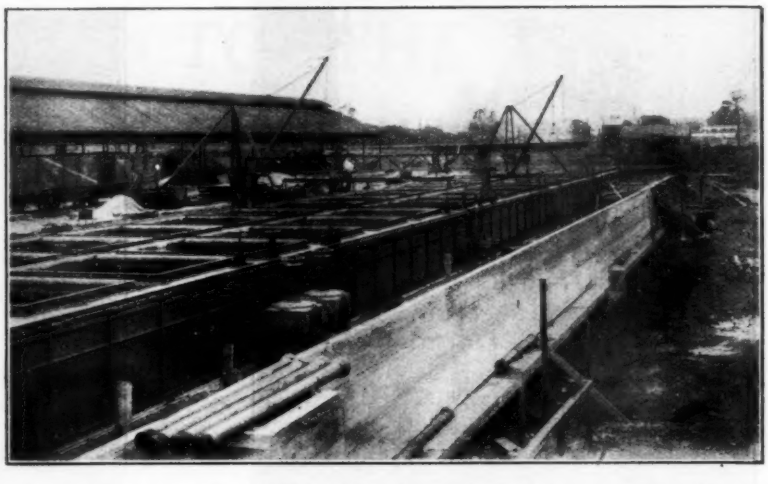
Revolving Observatory Roof which originally housed Mr. Crossley's 36 in. Reflector.



Patent "Eclipse" Rubber Joint and Original R.A. Fastener.



Latest Type Patent "Triumph" Fastener.



Five Purifiers, each 50 ft. by 30 ft. by 6 ft. deep with Clapham patent "Triumph" Valves, Automatic Fasteners, and "Eclipse" Rubber Joint, supplied to Coventry Corporation Gas Department.

a more than local reputation for improvements in foundry practice. Mr. T. A. Clapham was elected Chairman of the Board in 1923, and the laboratories have since exercised metallurgical control over the Company's products.

In more recent years the works and plant have been extended and modernized, and among new products may be mentioned the "Triumph" vertical and horizontal static washers, and the "Triumph" preheater for purifiers. A notable example of the latter, installed by the Birmingham Corporation, has a capacity of 20 million cu.ft. per day, and is probably the largest single unit of its kind at work. To keep abreast of present steel welded construction tendencies, up-to-date welding equipment has been installed for both steel and cast-iron welding, and also portable plant for carrying out work on the customer's own premises.

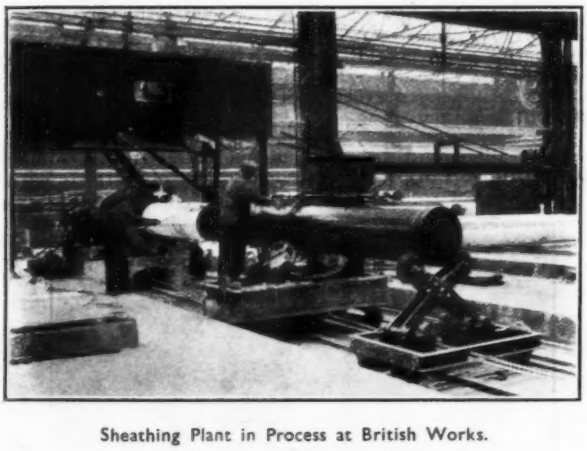
The firm's activities are not by any means confined to gas plant, but include the production of machinery for the manufacture of sand lime bricks, and the several new works which have been equipped during the last two or three years are capable in the aggregate of producing over one million bricks per week. Another new departure is a local machine tool business, which, acquired four years ago, has since been developed by Clapham Bros., Ltd., until its reputation for the manufacture of "Precimax" precision and production grinding machinery is second to none, and it has been found necessary to make considerable extensions and more than double the original plant.

THE MANUFACTURE, TESTING, AND PROTECTION of Steel Pipes for Gas Distribution

By J. H SMITH

(Central Research Department, Stewarts & Lloyds, Ltd.)

From a Paper read at the Meeting of the Western Junior Gas Association at Cheltenham on March 21



Sheathing Plant in Process at British Works.

Manufacture.

For welded tube, since weldability is of fundamental importance and the effect of carbon and certain other alloying elements is to impair this essential property, the steel used in this process must conform to a relatively narrow range of composition and mechanical properties, with carbon up to about 0·18% (about 28/32 tons per sq.in. tensile strength). For tubes up to, say, 6 in. diameter the steel is supplied in the form of hoop, and for larger sizes as strip or plate.

For the weldless processes the limitations as regards weldability do not apply, and consequently a greater range of steel as regards composition and mechanical properties is available.

Depending on the particular process employed, the material form is either squares or rounds, or in certain cases round cast steel ingots may be used.

Welded Tubes.

Two processes of welding are in general use for producing welded tubes. First, true welding, in which the surfaces are united entirely by heat and pressure at sufficiently high temperature. Secondly, autogenous welding, in which the edges of the joint are melted by oxy-acetylene flame or electric arc and fused together, a special filling material or metal from the arc point being added to make up any deficiency in the joint. The technique of welding by this method has now reached a high degree of perfection.

There are four types of welded tube having welds of three distinct kinds:

(*a*) Buttwelded.
(*b*) Lapwelded.
(*c*) "Hand," roller, or hydraulic welded.
(*d*) Electrically welded.

The buttweld process is used for tubes up to 2 in. diameter. It is the simplest, but requires a steel having a high degree of weldability and facilities for the handling of large outputs. The heated strip is bent to tubular form and welded simultaneously by being drawn through a bell-shaped die, which forces the edges together. The Fretz-Moon process differs from the older method in that, while formerly the strip was cut to lengths of about 20 ft. and each tube length welded separately, now the strip, in very great lengths made indefinitely long by crosswelding, is welded into one continuous tube afterwards cut to length as required.

The lapwelding process is used for sizes from 2½ in. to 15 in.

In both the lapweld and hydraulic weld processes the edges of the plate are scarfed or bevelled to ensure there being no excess of steel at the lap joint. The plate or strip is first rounded to tubular form and then welded, two separate operations against the one of the buttwelding process. In the lapweld process the whole tube is heated to a welding heat and welded by passing through rolls while in the hydraulic weld process the plate is bent cold and only the edges are heated for welding. The hydraulic weld process is used only for large pipes which tend to collapse under their own weight if the whole is brought to a welding heat.

Electric welding has been used in America for the production of sizes over 12 in. The process is the natural outcome of the development of the automatic electric welding head, and may be regarded as still in its infancy.

Weldless Tubes.

These are produced by various methods, all of which comprise two operations, (1) the provision of a hole in a solid bar, and (2) working the resulting hollow bloom to the required dimensions and form.

Two methods are used for piercing the solid billet. First, static pressure, whereby a suitable pointed mandrel is forced into the billet by a hydraulic ram. Secondly, rotary piercing, in which the billet is rotated between rolls operating obliquely on its circumference, causing cavitation to take place at the centre. The billet is gradually fed forward on to a suitably placed mandrel bar.

There are three methods of producing tubes from the hollow bloom: (1) Dies; (2) rolling; (3) pilgering. Figs. 1, 2, and 3, give diagrammatic views of the three main processes, termed, respectively, the push bench, automatic mill, and the Pilger mill.

The push bench process, used for small sizes, employs a series of dies through which the hollow bloom is pushed, not pulled, one end of the bloom is left solid in the piercing process for this purpose.

The automatic mill uses the rolling principle. The completely pierced hollow bloom is forced against the rolls behind which is placed a mandrel held on a rigid bar. Two or three passes through the mill are usually sufficient to produce the finished tube. This process is used for sizes from 2 in. to 6 in. A modified type of automatic mill is used for larger sizes by introducing a second piercer used as an expander.

The Pilger mill is essentially a forging process. The bloom is threaded on to a mandrel bar connected to a ram capable of giving it both a forward and reverse movement, in addition to a rotary motion, and is fed into the space between the "gap" rolls, which, rotating against the forward motion of the bloom, forge it into a tube.

Protection.

The solution of the difficulty of internal corrosion is to be sought along two lines:

(1) Drying the gas.
(2) Coating the mains to prevent corrosion.

The former is, in our opinion, the better method, as it eliminates the cause of the trouble, although probably the best arrangement would be to combine both.

Red lead or white lead paints have been used by some gas engineers for internal coating of mains, and following favourable reports on the protection afforded by such paints we carried out some years ago comparative tests on various paint coatings, including also coatings of boiled linseed oil. The results of these tests showed that a coating of linseed oil alone without pigment provided a very satisfactory protection for gas service conditions, and in view of these results it is now our practice to coat all gas mains internally with boiled linseed oil, except where paint coatings are specified.

Tubes, after being hydraulically tested, are cleaned and dried by heating before application of the coating. Paint coatings are usually applied by brush, but the linseed oil coating may be applied either by brush, spray or by dipping, this latter method being particularly suitable for service pipes.

DIAGRAMMATIC OUTLINE OF PUSH BENCH PROCESS.

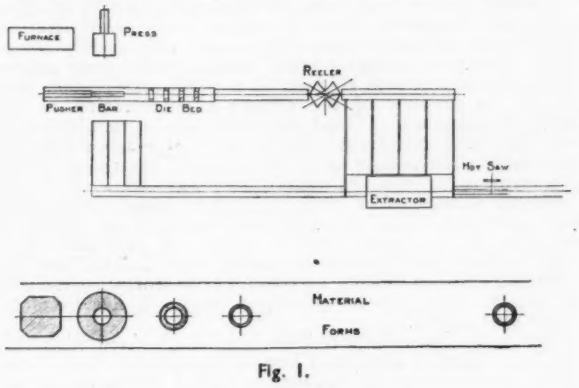


Fig. 1.

DIAGRAMMATIC OUTLINE OF AUTOMATIC MILL PROCESS.

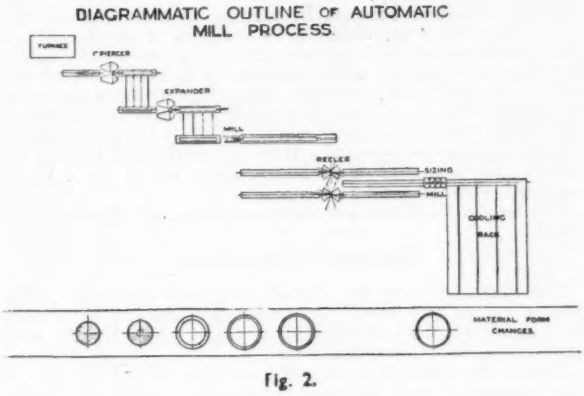


Fig. 2.

DIAGRAMMATIC OUTLINE OF PILGER PROCESS

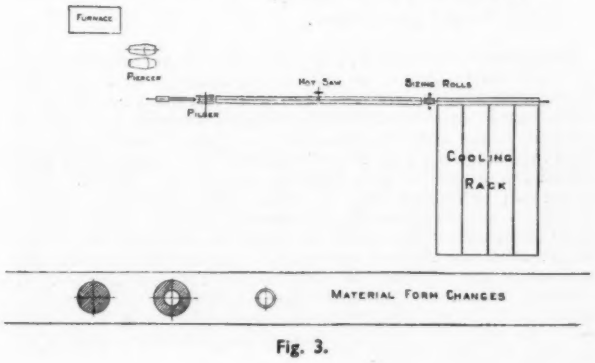


Fig. 3.

Corrosion of Buried Lines.

It has been established by intensive investigation that the corrosion of ferrous metals varies with the character of the soil and that all commonly used ferrous materials corrode at practically the same rate.

Soils vary very widely in corrosive activity and the degree of protection required for any particular service depends not only on the corrosivity of the soil as influenced by its chemical composition, but also to a large extent on its physical condition as affected by climatic variations, while in certain locations the possibility of electrolytic

corrosion due to stray electric currents has also to be taken into account.

Among natural soils, poorly drained clays or marshy soils are frequently very corrosive, while well drained sandy soils or sandy loams are usually only mildly corrosive. Rocky or gravelly soils, while usually only mildly corrosive, necessitate the use of a particularly good protection on account of the danger of penetration of the protective covering. Good protection is also required with made-up soils containing cinders or boiler ashes since in addition to the danger of penetration by the sharp cinder fragments such soils are usually very corrosive.

Chemical analysis of soils or water extracts therefrom are sometimes made in an attempt to assess the corrosive activity, but chemical analysis alone can only provide a very rough indication. A useful test known as the "Nipple and Can" test, by which the potential corrosivity of alkaline soils can be quickly determined, has been devised by Corfield.

The writer has compared the results obtained with this test on a number of soils of known aggressiveness and considers that this test in conjunction with a knowledge of the location and climatic conditions gives a reliable indication of the soil corrosivity.

Briefly the test consists in placing in a cylindrical tin 4 in. deep by 3 in. diameter a weighed 4 in. length of $\frac{3}{4}$ in. steel tube which has been previously cleaned by sand-blasting and washing with benzole. The lower end of the tube is plugged with a rubber stopper protruding for $\frac{1}{2}$ in. to insulate the tube from the bottom of the tin which is then filled with the water-saturated soil and a potential of 6 volts applied between the tube as anode and the tin as cathode for a period of 24 hours, after which the tube is removed, cleaned, and re-weighed.

The loss in weight in grammes is taken as the Corrosivity Index.

External Protections.

The material must be a good electrical insulator, sufficiently tough and strong to withstand damage in transit and handling, and permanently resist soil stresses and penetration by stones in the soil.

Petroleum bitumen possesses to a high degree the necessary chemical and physical properties required. Three classes of protection using a bitumen base are available.

(1) Bituminous coatings.
(2) Coating and wrapping.
(3) Special protections.

Bituminous coatings applied by dipping or brushing are not sufficiently strong to withstand damage in transit or laying and are, in any case, too thin to afford any lasting protection in even moderately corrosive ground, and on this account it has been the practice to reinforce such coatings by wrapping with one or more layers of impregnated and coated fabric such as jute hessian, cotton, or rag felt. The protection afforded by coating and ordinary single wrapping has not been found adequate for severely corrosive conditions whether due to corrosive soil and/or to the effects of stray electric currents. The inadequacy of the coating is due at least in part to the comparatively thin covering which is applicable by dipping. The wrapping merely acts as mechanical protection and does little if anything to augment the deficiency in protective power of the thin bitumen layer.

Double wrappings, on account of their greater thickness and to the fact that the underlying wrapping is protected by a thick covering of bitumen between the two layers of fabric, afford a very much better protection, but the presence of a fabric subject to decay in close proximity to the metal surface is considered to be an objectionable feature.

In the search for more efficient protections investigation has proceeded along two lines:

(1) Improved saturation and increased rot-resistance of the wrapping fabric together with the provision of a continuous layer of bitumen between the pipe and the fabric.
(2) Coverings dispensing with the necessity of fabric reinforcement.

From investigations and experiment on these lines two special external protections have been evolved, both of which are designed to meet the requirements of adverse soil conditions and stray current electrolysis—viz.:

(1) Security protection.
(2) Sheathing.

(1) Security protection differs from ordinary coating and wrapping in that a thick undercoating of bitumen is provided below the bitumen-impregnated wrapping, the fabric being also specially treated to increase its rot resistance.

(2) Sheathing is an intimate mixture of bitumen and inert mineral filler reinforced with short asbestos fibre, and is applied as a hot mastic to the external surface of the tube to form a seamless, self-supporting, tough and adherent waterproof covering of predetermined uniform thickness from $\frac{1}{8}$ in. on small to $\frac{1}{4}$ in. on large diameter tubes.

Both types of protection are provided with a heat-reflecting, non-stick coating of limewash, such coating having the further advantage of facilitating the detection of any damage sustained by rough handling in transit.

The Security type, although primarily designed for the protection of service pipe, can be supplied for larger mains, while sheathing can be supplied on all sizes from 6 in. upwards.

Sheathed pipes can be provided with an additional wrapping of bitumen-impregnated hessian, but this is only required in exceptional cases as a mechanical protection against rough handling in shipment or under difficult transport conditions.

Mention might here be made of the special Security type protection evolved by the Bataafsche Petroleum Company for the protection of oil lines in exceptionally corrosive locations, a thick undercoating of bitumen-asbestos composition being used for the undercoating, and mechanical protection afforded by a wrapping of impregnated coated coir fabric, the special merit of this material being its inherently high rot-resistance compared with untreated jute hessian. Its present high cost, however, militates against its general adoption.

Protection of Joints.

The completion of the protection at the joints can be satisfactorily achieved by the use of filled bituminous compositions applied by means of moulds.

The essential characteristics of the bituminous materials used for pipe protection are high electrical insulation and waterproofing properties, combined with high resistance to destructive influences such as the effect of high and low temperature, mechanical abuse, and the physical and chemical effects of the soil.

In the selection of the materials and in their preparation and application an extensive system of testing has been built up to ensure that the coatings possess these essential features.

Gas Undertakings' Results

Australian Gas Light (Sydney).

The report of the Directors of the Australian Gas Light Company for the year ended Dec. 31, 1935, states that the net profits for the past year, including the balance brought forward (£88,634), amount to £324,099, less dividend at the rate of 3% paid on Aug. 16, 1935, £123,300, leaving a balance at the credit of the profit and loss appropriation account of £200,799. The Directors recommend the payment of a dividend for the past half-year at the rate of 3% on the "A" and "B" shares, which will absorb £123,300, leaving a balance to be carried forward of £77,499. Following on a resolution which was passed by proprietors at the annual general meeting held on Aug. 15, 1935, and subsequently confirmed at a special general meeting held on Sept. 12, 1935, the period covering the annual statement of accounts has been altered from June 30 to Dec. 31 in each year, and in accordance with the resolution the annual meeting of proprietors will now be held during the month of January in each year or as soon thereafter as the Directors may decide. At Dec. 31 last an amount of £19,817 stood to the credit of the fidelity guarantee fund. This fund is not shown in the balance-sheet, but is administered by the Chairman of Directors and Secretary for the time being of the Company. In terms of the Gas and Electricity Act, 1935, the Directors are empowered to transfer to the superannuation fund such an amount of the fidelity fund as a Board constituted under the Gas and Electricity Act, 1935, may determine. It is proposed to request the Minister administering the Act to shortly appoint a Board to deal with the matter.

Corbridge.

The report of the Directors of the Corbridge Gas Company for the year ended Dec. 31, 1935, states that since the Company had obtained a showroom at Corbridge sales of gas had increased by 10% in face of severe competition. During the past three years 666 additional fires and gas cookers had been fitted by the Company. The accounts show a gross profit of 1,034 and a dividend of 6% less tax was declared. The report refers to the retirement for health reasons after services over a long period of Mr. George Renwick. Mr. T. A. Seagrave and Mr. H. Douglas Lees had been appointed to vacancies on the Board.

[*Further Undertakings' Results will be found on pp.* 58 & 59.]

Radiation Limited

Mr. H. James Yates' Speech at the Ordinary General Meeting

At the Annual Meeting of the Company held at The Incorporated Accountants' Hall, Victoria Embankment, London, on the 25th March, 1936, the Chairman, Mr. H. James Yates, said:—

Before proceeding with the business of this Meeting, I must refer to the very great loss we have sustained by the death of our esteemed colleague, Mr. Robert W. Elder. He had great underlying strength of character; his vision and sound views were of great value to us, and his goodwill and mature judgment were always available and freely given whenever required.

I will now deal with the Directors' Report and Accounts, together with the Statement combining the Assets and Liabilities of the Subsidiary Companies. You will have already considered these, but I propose briefly to review the figures.

The Profit and Loss Account, on pages 4 and 5 of the Accounts, shows the Net Income from Subsidiary Companies for the year, together with Transfer Fees and Bank Interest, at £327,391, as compared with £325,340 for 1934, an increase this year of £2,051. The Balance of Profits brought forward from last year was £128,102, so that after deducting the Interim Dividends paid in October last, there remains to the credit of the Profit and Loss Account the sum of £375,412. That amount is carried to the Balance Sheet above, and deducting the proposed Final Dividends, together with the Bonus of 2½ per cent., which the Directors recommend should again be paid to the Ordinary Shareholders, there remains a balance of £141,901 to carry forward to next year, compared with £128,102 a year ago.

The Radiation Balance Sheet does not call for any special comment. The principal items on the Assets side are the cost to Radiation of the Investments in Subsidiary Companies, £2,392,675, and the amount of £1,424,883 due from those Subsidiary Companies to Radiation. The latter amount includes the Dividends declared by the Subsidiary Companies for 1935, the balances of Dividends for past years, and also charges paid in the first instance by Radiation on behalf of the Subsidiary Companies.

Turning to the combined Statement on pages 6 and 7 of the Accounts, on the Assets side you will observe that Freehold and Leasehold Land and Buildings, and Plant and Machinery, after deducting depreciation and provision for obsolescence, show a decrease of £27,411, compared with the previous year. The total of these Assets now stands at £1,043,645.

Stocks, Sundry Debtors, and Cash Balances are greater than last year by £156,136, reflecting the increase in trade during the year. A corresponding increase is shown in the item Sundry Creditors, Taxation and Contingency Reserves, which is £145,457 more than last year. Investments show an increase of £110,674.

On the opposite side of this Statement you will see that the Debentures of Subsidiary Companies have been reduced to £23,350, a Subsidiary Company having redeemed its Debentures amounting to £26,400.

I have mentioned the Creditors item when dealing with Stocks, Debtors and Cash.

The next two items, totalling £3,817,558, correspond with similar amounts on the Assets side of the Radiation Balance Sheet, to which I have already referred.

The Balance to credit of Profit and Loss Accounts of the Subsidiary Companies now amounts to £343,569 compared with £238,707 at December, 1934.

A Record Established.

The past year has established a record as regards volume of trade, but as each year comes along we, like other very large manufacturing concerns, find many difficult problems before us. I have often heard men who are responsible for conducting smaller businesses say how they envy those who direct some of the larger concerns in this country. Believe me, ladies and gentlemen, I rather envy those who manage the smaller business undertakings. It is not the case, as is sometimes thought, that the largest concerns hold an impregnable position. However good their organisation and management may be, it is very difficult to exercise the control that is possible in smaller undertakings. Fluctuating conditions, and also competition, may not affect the very large concerns so quickly, yet a serious fall in their output would be much more difficult to contend with than in the case of smaller businesses, where the methods of production and the plant are comparatively simple, and where it is possible, therefore, to make more easily the adjustments necessary to meet changes in trading conditions.

Again, a manufacturing Company that has successfully built up a huge turnover has necessarily incurred very heavy expenditure in buildings, specialised plant and equipment, in order to obtain the required output, and the production having been enormously increased, it is essential for it to be maintained, otherwise with a falling turnover it would be found that manufacturing costs would not fall proportionately to the output. Profits, therefore, would rapidly decline, not only because of loss of trade, but also because the standing charges remain more or less stationary and would not fall in proportion to the reduced output—in other words, the cost per article increases.

Further, if the demand for the Company's goods were restricted and it became necessary to curtail the output, then a large part of the costly plant would be idle, and it might be necessary to write down substantially the value of Buildings and Plant in the Company's books. This additional loss, occurring at a time of diminishing profits, would be very serious unless adequate Reserves were available to meet this contingency.

Although our turnover last year was in excess of that of any past year, and constitutes a record, yet our profits have not responded proportionately, because costs have shown a general increase. We have had to meet certain increases in wages and pay higher prices for our raw materials; we have embodied in our goods further improvements and developments which have added to the cost of manufacture, but our selling prices have not been increased. This year we are again faced with increases in wages, and in addition, a further increase in the cost of our raw materials. Unless, therefore, our turnover can be again increased, we cannot expect to maintain the same margin of profit.

You will know that apart from our Gas Stove business we are manufacturers of many other types of apparatus, some of which have been subject to competition so acute that during the past year much of this trade yielded no profit, but resulted in a loss. This has been due in part to foreign competition—labour abroad is paid on a lower basis than in England, and together with the subsidies so frequently given in other countries, goods can be imported into this country at prices often lower than the cost of producing them here. We could go some way to meet this competition by lowering the quality of our products, but this we are not prepared to do.

At this point there are one or two other matters I should like to mention.

We still have a number of the original Radiation Shareholders; they will be aware of the steady progress your Company has made, and by their confidence in the business they have had a very profitable investment. But with the passage of time competition has become intensified, and for this and the other reasons to which I have referred, it would be hazardous to assume that our profits will always be maintained at the present level.

From time to time there are references and suggestions as to the possibility of the Company still further increasing its distribution to Shareholders. It has always been my endeavour to make your investment, as far as possible, a Gilt-Edged Industrial investment for you, and I think it can be claimed that up to the present time we have succeeded—and I could not be a party to a deviation from this policy, which has served us so well.

Provision for Contingencies.

There are also references to the conservative position of our Balance Sheet. I may say we were among the first Companies to give Shareholders, in addition to the statutory Balance Sheet, a consolidated Statement of the Assets and Liabilities of the Constituent Companies. I do not hesitate to tell you that we have substantial Reserves—we must have them, as indeed must all Undertakings of our size and position. Changes are taking place continually, and the developments and improvements which we make in our goods sometimes render necessary the scrapping and entire replacement of plant and machinery, and even of buildings. We are bound, therefore, to make ample provision so that the arising of contingencies, such as those I have indicated, would not seriously affect either the resources or the profits of your Company.

It is sometimes thought that we are in the position of having somewhat of a monopoly of our trade; it cannot be too strongly emphasised, however, that this is very far from being the case, and indeed it is a good thing that we have no such monopoly because competition is good for all of us—it gets the best out of us. Our large resources, however, have enabled us to carry out extensive Research work—and our annual expenditure in Research amounts to a very substantial figure; this work has contributed very largely to our present strong position.

All pure Research work is carried on at the Central Research Laboratories, Radiation House, London. When any particular piece of work has passed beyond the theoretical stage and requires elaboration on a more practical basis, involving the resources of a Works, it is transferred to our Works Experimental Laboratories. And here I would like to tell you that, owing to the growth of our business, we are building new offices at our Essex Works in Birmingham, and at the same time we are taking the opportunity of also building new practical Laboratories equipped in such a way as to enable us to put into effect the result of our Research work. We have always held the premier position in our Industry, and you can rest assured that, come what may, we shall do everything to retain that position.

I have always endeavoured to give you, as briefly as possible, an epitome of our work, and at the risk of wearying you I am going to tell you something of this again.

The sales of our "New World" Cookers during the past year again constitute another record. There are millions of satisfied

users. We continue to receive numerous unsolicited testimonials giving unstinted praise of our "New World" Cooker. We have asked for permission to publish some of these testimonials in the Press, accompanied in each case by the photograph of the sender, and this permission has been willingly given. I think you will agree with me that this speaks volumes for the high regard in which our cookers are held.

The "New World" Cooker, with the "Regulo," was the result of our Research work extending over many years, and it revolutionised gas cooking. In the "New World" Cooker there is a single burner which is at the back of the oven, together with the direct bottom-flue-outlet, a construction which produces different zones of heat in the oven. The fitting to the "New World" Cooker of the "Regulo" automatic oven-heat control—the result of well over thirty years' intensive Research work on gas thermostats—was the crowning effort which ensured absolute control of the oven temperature, perfect cooking, and economy in consumption of gas. All that is necessary is to place in the oven anything from a single dish to a full-course dinner, with the "Regulo" set at the proper number according to the instructions; then it only remains for the cook to note the time the food is placed in the oven, and remember to open the oven door once the proper time has elapsed—when it will be found that the food is perfectly cooked. This is all summed up in our slogan—"Trust the 'Regulo' for perfect cooking." Naturally our success has stimulated others, but the "New World" Cooker with the "Regulo" stands in a class by itself.

I cannot emphasise too strongly that the "Regulo" is made solely by Radiation, and can only be obtained on Radiation apparatus. The names "Regulo" and "New World" have been registered as Trade Marks by us in many countries and they may now be called household words.

The novice in cooking has nothing to fear when using a "New World" Cooker in conjunction with the Radiation Cookery Book, and more experienced cooks have the satisfaction of knowing that their successful results can be repeated with certainty from day to day.

The Radiation Cookery Book is now in the third reprint of its Eighteenth Edition. At our last Meeting I referred to the fact that the paper used for our Cookery Book, if stacked in reams, would form a column nearly four times the height of St. Paul's Cathedral. The paper used to date, if stacked in reams, would now be five times the height of St. Paul's, a remarkable fact which proves the popularity and the value of the Radiation Cookery Book.

The Recipes and Whole-Dinner Menus have been tested by our own staff of expert cooks in the Radiation Research Kitchen. This Kitchen continues to be visited by a large number of professional cooks from all over the country, and even from abroad. It is also a great satisfaction to us that we are frequently asked to allow students of Cookery Classes in Technical Schools in different parts of the country, to visit our Research Kitchen to witness demonstrations.

National Milk Recipe Competition.

Last year the London "Daily Mail," in association with the Milk Marketing Board, organised a National Milk Recipe Competition, and we were asked to assist them in this project—a tribute to the experience and resources of your Company, and to the "New World" Cooker. The final judging took place under distinguished auspices at Radiation House on September 30th, 1935. This contest drew the interest of vast numbers of the public—in fact no less than 49,000 entries were received from the date the competition opened on July 15th. It is extremely gratifying, though hardly surprising, that Radiation House, with its Research Kitchen and its highly trained staff, was singled out as pre-eminently the place for the preparatory work and the final judging of the recipes in such an important contest. The Lady Mayoress of London was one of the judges who were present at Radiation House on September 30th. Others were—The Lady Mayoress of Bristol; The Lady Mayoress of Cardiff; Mrs. Walter Elliot, wife of the Minister of Agriculture; Mrs. Steward and Miss Underhill of the National Federation of Women's Institutes; Sir John Orr, the dietetic expert. The result of this contest was an amazing success, and it has emphasised the great importance of Milk as an article of diet, and how innumerable recipes can be cooked to perfection in the "New World" gas oven with its "Regulo" control.

I would like to emphasise what I told you in my Address last year, that for a number of years we have been investigating the types of energy emitted by various heating apparatus. This work involved the determination of the intensity of the energy of various wave-lengths emitted, but in the early years it was very difficult to obtain the apparatus to carry on this work, and owing to extraneous electrical disturbances and the vibrations due to traffic, trains, etc., during the day, the work could only be carried on for a few hours during the night. However, we were able to devise means through which, by the use of special apparatus, these difficulties were overcome. Everyone appreciates the healthful effect of the sun's rays, and it was our endeavour to produce a gas fire which would be bright, without glare, and at the same time emit a more comforting warmth than had previously been attained.

Certain of the sun's rays, the short infra-red, when they fall on the surface of the human body, penetrate more deeply than do the long infra-red rays, and the visible rays penetrate still more deeply. The penetration of the heat stimulates the flow of blood through the fine capillaries which lie near the surface, and leads to a sensation of warmth without dryness of the skin. Our "Thermo-XX Beam" radiant, which eventually became known as the "Beam," was the first radiant designed to emit an increased proportion of short infra-red rays, and its introduction marked a new stage in the development of the gas fire. The High Beam fire is a further advance in this direction.

I have no hesitation in saying that our High Beam fires have proved to be the most efficient radiant gas fires in the world.

We introduced, three seasons ago, the self-lighting tap which has been of great benefit to users of gas fires, and has eliminated the use of matches. As usual, we have been flattered by having "copyists": we find this sort of thing most refreshing and it only spurs us on to do better things.

As I said earlier, there are many other classes of apparatus which we manufacture apart from gas cookers and gas fires, but I have mentioned them on so many occasions that I will not attempt to refer to them now.

The Gas Unit.

I am glad to be able to tell you that as a result of our advocacy the Gas Unit is now becoming well established. There has always been difficulty in comparing the price of gas and electricity owing to the disparity between the heat values of the Gas Therm and that of the Electric Unit. It is generally overlooked that the Therm is equivalent to 100,000 British Thermal Units of heat, whereas the Electric Unit is equivalent to only 3,412 of the same heat units. We have strongly advocated the use, particularly by gas salesmen, of a unit smaller than the Therm and have recommended a Gas Unit of 4,000 British Thermal Units, which is one twenty-fifth of a Therm, the price of the Gas Unit being found by multiplying the price of the Therm by 4 and dividing by 100. For example, with gas at 9d. per Therm, the price of the Gas Unit of 4,000 B.Th.U. is 0·36d., *i.e.*, less than ½d. In this way the price of the Gas Unit can readily be calculated from that of the Therm in any district and can then be compared with the price of the Electric Unit (kilowatt-hour) ascertained by dividing the total charges made by the number of these units used.

Our continued progress and success have only been attained by the hearty co-operation of all our officials and workpeople and staff, and again our thanks go out to them for their most loyal help.

I have pleasure in moving:—

"That the Directors' Report and Accounts for the year ended 31st December, 1935, as presented by the Directors, be received and adopted, and that Final Dividends and Bonus be declared as follows:—3 per cent., less Income Tax, for the half-year to 31st December, 1935, on the 6 per cent. Cumulative Preference Shares; 9⅜ per cent., less Income Tax, on the Ordinary Shares, making, with the Interim Dividend, a total Dividend of 12½ per cent. on the Ordinary Shares for the year; and a Bonus on the Ordinary Shares of 2½ per cent., less Income Tax."

After the Report and Accounts had been adopted, a vote of thanks, coupled with an expression of confidence in the efficiency of the Board, was proposed by a Shareholder and carried unanimously.

Further Gas Undertakings' Results

Cannock (Gas Consolidation).

The annual report of the Directors of the Cannock District Gas Company for the year ended Dec. 31, 1935, states that the accounts show the receipts on revenue account D for the year to have been £37,077. Add bad debts reserve not required and interest on hire-purchase agreements (Account E) £590, £37,668. To this is added the balance brought forward from last year, £5,390, making a total of £43,058. Expenditure amounts to £30,336. The balance to credit of profit and loss account is £9,966. The Directors recommend that this amount be appropriated as follows: In payment of interim dividends in July last, £1,895; in payment of the dividend on the preference shares at the rate of 5% per annum, less tax for the half-year ended Dec. 31, 1935, £111; in payment on March 18, 1936, of a dividend of £4% (less tax), making £7½% for the year ended Dec. 31, 1935, £2,038; in writing off balance of the costs of obtaining the order of 1931, £293; in transferring to the redemption fund £650; and in carrying forward to next year the balance of £4,977. The sales of gas during the year amounted to 537,014 therms. The number of consumers at Dec. 31, 1935, was as follows: Ordinary meters, 1,424; prepayment meters, 10,204—making a total of 11,628.

Dover (South-Eastern).

The report of the Directors of the Dover Gas Company for the year ended Dec. 31, 1935, shows that after paying in respect of the first half-year a dividend of £3 15s.% on the ordinary stock and shares, and after providing for all fixed charges, and contributions to special purposes, renewals, and co-partnership funds, there is a total available balance of £17,505, out of which the Directors recommend the payment (less income-tax) of the following dividend in respect of the second half-year—viz., at the rate of £4 15s.% on the ordinary stock and shares (making, with the interim dividend, 8½% for the year), which will absorb the sum of £5,819, leaving £11,687 to be carried forward to the credit of the current year. The sales of gas show an increase of 20,693 therms, equal to 1·2% over the previous year. The number of consumers has increased by 187.

Guildford.

The report of the Directors of the Guildford Gas Light and Coke Company for the year ended Dec. 31, 1935, states that the sale of gas shows an increase of 2,552,870 cu.ft. compared with the previous year. The decrease in revenue from the sale of gas is due to a reduction in the price. The sale of electricity in the Cranleigh area shows an increase of 203,413 units over the previous year. The balance standing to the credit of the profit and loss accounts, including the amounts brought forward, is £22,170. The Directors recommend payment of final dividends (less tax) as follows: On the 5% preference stock 2½%, making 8% for the year; on the 6% preference stock 3%, making 6% for the year; on the consolidated ordinary stock 4%, making 8% for the year; and on the electricity ordinary stock 4%, making 8% for the year. This will absorb £6,227, leaving £15,943 to be carried forward. The reserve fund account stands at £12,866. The Directors regret to report that Mr. H. E. Smith died during the year. They appointed Mr. W. H. Oakley to fill the vacancy on the Board.

Londonderry.

The Directors of the Londonderry Gas Light Company submit accounts for the year ended Dec. 31, 1935, which show that the undivided balance brought forward from the previous year, after payment of dividend, amounts to £13,813, to which is added the year's profit, as shown by revenue account, £3,607, making a total of £17,421. Out of this sum there has been paid a year's interest, less income-tax, on the loan capital, interim dividends to June 30, 1935, of 5% on the old shares, and of 3½% on the new shares, less income-tax, leaving a balance of £15,512. The Directors propose to pay a final dividend for the year to Dec. 31, 1935, of 5% on the old shares, and of 3½% on the new shares, less income-tax, which will absorb £1,747, leaving to be carried forward to the next account the sum of £13,764. A sum of £1,500 has been charged in the revenue account for the purpose of meeting future cost of renewals.

Rushden.

The Directors of the Rushden and Higham Ferrers Gas Company, in their report for the half-year ended Dec. 31 last, recommend the declaration of a dividend for the half-year at the rate of £15 10s.% per annum on the original ordinary stock and at the rate of £10 17s.% per annum on the additional ordinary stock.

Seaham.

Regarding the proposed amalgamation of the Seaham Gas and Lighting Company with Sunderland Gas Company in accordance with a resolution passed by the Company on Feb. 20, proceedings to obtain the consent of the Board of Trade to the amalgamation are now being actively taken and it is hoped the amalgamation will be effected during the present year. The report for last year shows that including £1,779 brought forward from 1934 the sum available on profit and loss account is £3,611. Out of this sum interim dividends for the six months ended June last and interest on mortgages amount to £1,143, leaving £2,467. After paying final dividends for the half-year ended December the sum of £1,704 is left to be carried forward. The dividends recommended are 2½% on the preference stock, making 4½% for the year; 3% on the "A" stock and "B" shares, making 6% for the year; and 2½% on the "C" stock, making 4½% for the year.

Thirsk.

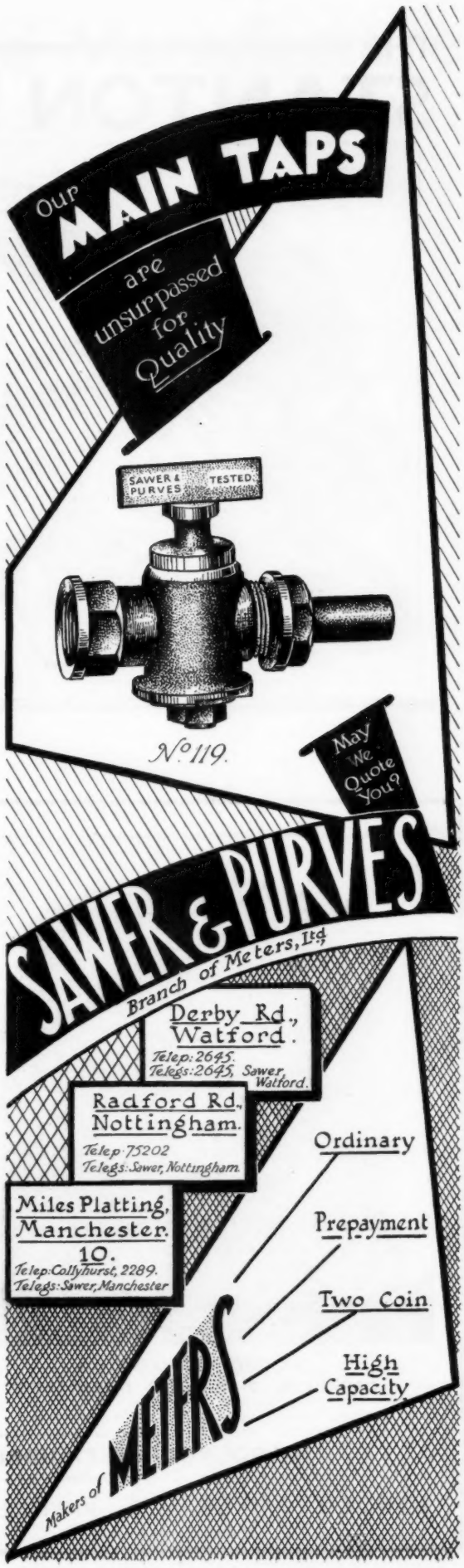
The report of Thirsk Gas Company shows a profit of £1,688 for the past year and the profit and loss account after being charged with the interim dividend and interest on the preference shares and debentures and bank charges has a credit balance of £1,032. The Directors recommend the payment of a dividend of 2½% on the £12,000 share capital less tax for the half-year, making with the interim dividend 5% for the year. After writing off £200 for the debenture suspense account and £200 off meters and cookers there is a balance of £332 to be carried forward.

Torquay and Paignton.

The report of the Directors of the Torquay and Paignton Gas Company states that the yearly statement of the accounts shows a balance of £13,168 to the credit of the profit and loss account on Dec. 31, 1935. The Directors recommended that, after allowing for the interim dividend paid on Oct. 1 last, the full year's dividend be declared, and that the balance be remitted, less income-tax, to the stockholders. The sales of gas continue to develop, the increase for the year amounting to 22½ million cu.ft., or 3·57%, and the sales of appliances have eclipsed all previous records. The return from the sale of residuals products also establishes a record in the history of the Company.

Wellington (New Zealand).

The report of the Directors of the Wellington (New Zealand) Gas Company for the year ended Dec. 31, 1935, states that during the past year 1,073 services were connected and 2,518 cookers installed. After payment of the interim dividend of 4% on the ordinary shares, the year's dividend on the preference shares, and providing for depreciation of plant, buildings, and machinery, also debenture redemption fund and insurance fund, the balance to the credit of profit and loss appropriation account amounts to £26,051. It is recommended that this sum should be appropriated as follows: To payment of a further dividend of 4% (making 8% for the year), £11,152, and carry forward the balance of £14,899.



THE
STANTON MECHANICAL
LEAD JOINT

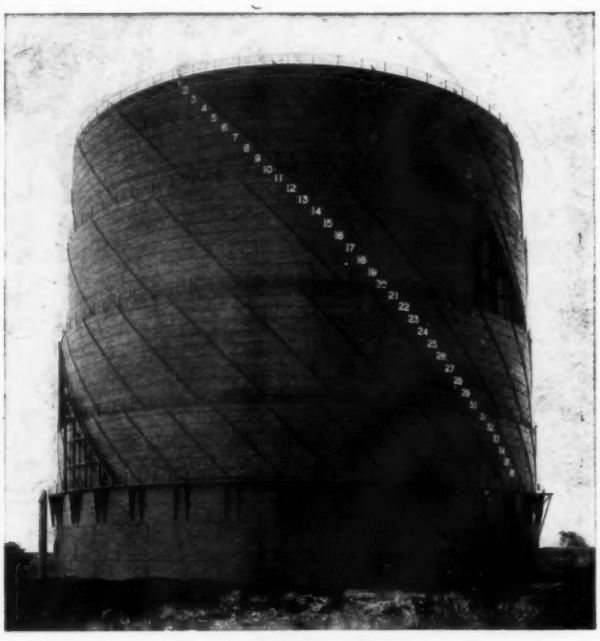
NO INCREASE IN COST OF PIPELINE

The troublesome operations of lead melting, running and caulking are dispensed with in this new lead joint. To make the joint, a *pre-cast* lead ring is slipped over the pipe spigot, two half-collars are placed in position, and the operation is completed by tightening four high-grade, cast-iron setscrews with an ordinary spanner.

The lead ring is positively held in position by the half-collars, and cannot be dislodged. A steel spring insertion ring, cast inside the lead, serves to distribute the end pressure so that the lead makes effective contact throughout its full depth.

Patent Nos. 404955 and 433137

THE STANTON IRONWORKS COMPANY LIMITED, Near NOTTINGHAM



AT WOLVERHAMPTON
CAPACITY, 3 MILLION CUBIC FEET

C. & W. WALKER

LIMITED
DONNINGTON
Nr. WELLINGTON
—SHROPSHIRE

'Phone: Lilleshall Shropshire Nos. 34 & 35 (2 lines)
'Grams: "Fortress," Donnington, Shropshire

SPIRAL GASHOLDERS

BRITISH MATERIALS
BRITISH LABOUR
HIGHEST QUALITY
IN
WORKMANSHIP

70 YEARS' EXPERIENCE

MILBOURNE SELF-LUBRICATING ROLLER CARRIAGES

LONDON OFFICE — 70, VICTORIA STREET, WESTMINSTER, S.W.1

'Phone: Victoria No. 1941 'Grams: "Fortress," Sowest, London

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

One of the unpopular three-week Accounts opened on Monday last. It is unfortunate that this should coincide with the present political tension, but if happily during its run some better news is forthcoming of the European situation it may turn out a worthy exception to the general rule. Taking all things into consideration, markets were very steady last week and prices well maintained. Gilt-edged stocks closed a trifle higher, and home rails remained firm on the good traffic returns. Industrials on the whole were somewhat neglected and prices weakened. In the more speculative groups considerable activity took place in South African gold-mining shares, particularly those of the low-grade mines, on account of the Union's new taxation proposals.

Though many other sections were comparatively neglected, business in Gas stocks and shares was heavier than the previous week, and several quotations advanced in value. The increase in the final dividend by the Alliance and Dublin Company, referred to last week, led to a further rise of 5 points to 155, and assuming a distribution for the current year at the full statutory rate, the yield on the current price works out at £4 18s. 4d.%, a useful investment. A parcel of Barnet stocks changed hands at 167, the price rising 3 points to 169½, and Lea Bridge advanced a similar amount to 177½, while it will be seen in the Stock and Share List that several other stocks gained a point or two. In the Supplementary List, Guildford consolidated made a spectacular rise of 15½ points to 190, otherwise prices in this List remained unchanged. There were two small improvements on the Provincial Exchanges—viz., Liverpool at 135 and South Shields at 172, both showing a gain of 1 point.

Current Sales of Gas Products

The London Market for Tar Products.

March 30.

The prices of tar products remain steady at about the following levels:

Very little business is being done, at present, in pitch, the price being about 40s. to 42s. 6d. per ton f.o.b.

Creosote, 5½d. per gallon.

Refined tar, 3⅞d. per gallon in bulk at makers' works.

Pure toluole, about 2s. 8d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine, about 4s. 3d. to 4s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

March 30.

The average prices of gas-works products during the week were: Gas-works tar, 24s. 3d. to 29s. 3d. Pitch—East Coast, 42s. 6d. to 45s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 42s. 6d. to 45s.* Toluole, naked, North, 2s. 2d. to 2s. 4d. Coal-tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 6d. to 1s. 6½d. Heavy naphtha, North, 1s. to 1s. 1d. Creosote, *ex* works, in bulk, North, liquid and salty, 4⅝d. to 4⅞d.; low gravity, 4⅜d. to 4⅝d. Heavy oils, in bulk, North, 4¾d. to 5d. Carbolic acid 60's, 2s. 4d. to 2s. 6d. Naphthalene, £19 to £21. Salts, 95s. to 100s., bags included. Anthracene "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

Tar Products in Scotland.

GLASGOW, *March* 28.

Business in the lighter fractions is now somewhat restricted for want of prompt supplies. Pitch, refined tar, and, to a lesser extent, creosote oil, however, are still available in quantity.

Crude gas-works tar.—The actual value is 32s. to 33s. per ton *ex* works in bulk.

Pitch is being held for 35s. to 37s. 6d. per ton f.o.b. Glasgow for export, and 35s. per ton *ex* works in bulk for home trade, but no business is being conducted at these prices.

Refined tar.—There is talk of increasing price by arrangement, but meantime actual value is round 3d. per gallon f.o.r. makers' works naked.

Creosote oil.—Low gravity grade is distinctly scarce but other grades are sufficiently plentiful to meet demand. B.E.S.A. Specification, 5⅛d. to 5⅜d. per gallon; low gravity, 5¼d. to 5½d. per gallon; and neutral oil, 5¼d. to 5½d. per gallon; all f.o.r. in bulk.

Cresylic acid.—With makers fully sold for some time forward, values are nominal as follows: Pale, 97/99%, 1s. 7½d. to 1s. 8½d. per gallon; dark, 97/99%, 1s. 5d. to 1s. 6d. per gallon; and pale, 99/100%, 1s. 10½d. to 1s. 11½d. per gallon; all *ex* works naked.

Crude naphtha is valued at 5½d. to 5⅜d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha is 1s. to 1s. 1d. per gallon.

Motor benzole is offered at 1s. 3½d. to 1s. 4d. per gallon in bulk at makers' works.

Pyridines.—90/160 grade is 5s. to 5s. 6d. per gallon, and 90/140 grade is 5s. 6d. to 6s. per gallon.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 8½	to	0 9	per gallon at works
Motor ,, . . .	1 2	,,	1 2½	,, ,, ,,
90% ,, . . .	1 3	,,	1 3½	,, ,, ,,
Pure ,, . . .	1 7	,,	1 7½	,, ,, ,,

Contracts Advertised To-Day

Boiler (Waste Heat).
Newbury Gas Department. [p. 66.]

Compressing Plant.
Newbury Gas Department. [p. 66.]

Gasholders (High Pressure and Spirally Guided).
Newbury Gas Department. [p. 66.]

Pipes and Fittings.
Oldham Gas Department. [p. 66.]

Retorts.
Keighley Gas Department. [p. 66.]

Turbo Booster.
Leeds Gas Department. [p. 66.]

Trade Notes

FoxFlex, Ltd.

The manufacturing and patent rights of "FoxFlex" tubing have been transferred from the Fox Water Heater Company to FoxFlex, Ltd., and all enquiries should be addressed to that Company, at 8, Leonard Street, City Road, London, E.C. 2.

Drakes, Ltd.

Report of the Directors

The Directors of Drakes, Ltd., state in their annual report for the year ended Dec. 31, 1935, that the profit for the year is £1,092, against a loss of £4,653 in the previous year. There was an improvement in trade during the past year and it is hoped that this will be maintained. The Directors regret to report that on account of increasing business activities in other directions, Mr. C. F. Spencer has found it necessary to resign his seat on the Board, and they wish to place on record their appreciation of the valuable assistance he has rendered to the Company.

Gas Undertaking Result

Ascot.

The Ascot District Gas and Electricity Company has so far made very great progress during the last ten years and the sales of gas have increased from 66,887,500 cu.ft. to 126,837,500 cu.ft. in 1935. During the last year the sales of gas increased by 6·5% over the sales in 1934, and the unaccounted-for gas during the past year was reduced by just over 1% less than last year. During the last year various extensions to the gas mains have been carried out, resulting in increased business to the Company. The total length of gas mains laid in the Company's area now exceeds 90 miles. The number of new gas consumers added for the year is 339, the total number of gas consumers now being 4,878. In February last year gas exhibitions and cookery demonstrations were held at Sunninghill and Bracknell, which proved to be a huge success. Over £1,000 worth of business in the sales of gas appliances was done during the two weeks of the exhibition. The sales of gas appliances to consumers have been a record for the past year, the turnover reaching almost £9,000, the profit on the gas revenue account being £15,409. The Directors recommend a full dividend of 5% on the original shares and 3½% on the additional ordinary shares, making a total for the year of 10% on the ordinary shares and 7% on the additional ordinary shares.

Get the most out of every class of coal in every size of works by adopting

THE WEST SYSTEMS

- GLOVER-WEST VERTICAL RETORTS
- WESTVERTICAL CARBONIZING CHAMBERS
- COAL AND COKE-HANDLING & PREPARATION

Orders for Glover-West vertical retort installations have been received during the present year from the Dudley, Brierley Hill & District Gas Company (3rd order), the Kelso Gas Company, Ltd., the Altrincham Gas Company (3rd order), the Bilston Gas, Light & Coke Company (2nd order), and the Grangemouth Corporation Gas Department (2nd order).

- Carbonizing plants have been recently put into commission at Stratford-on-Avon, Buxton, Kilsyth, Montrose (2nd order), Manchester (6th order), Slough, Johannesburg (2nd order), St. Helens (4th order), St. Albans and Willenhall.

WEST'S GAS IMPROVEMENT COMPANY, LTD.

MANCHESTER: Albion Ironworks, Miles Platting 'Phone: COLLYHURST 2961 : 'Grams: "STOKER, MANCHESTER"

LONDON: Columbia House, Aldwych, W.C.2 'Phone: HOLBORN 4108 : 'Grams: "WESGASCO, ESTRAND, LONDON"

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Mar. 27	Rise or Fall on Week	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 16	7	7⅜	Alliance & Dublin Ord. ...	150—160*	+5	155—156½
374,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb. ...	95—100	...	...
557,655	,,	Feb. 17	7	7	Barnet Ord. 7 p.c. ...	167—172	+3	167
300,000	1	Oct. 7	1/9⅛	1/4⅛	Bombay, Ltd.	1 1/16—1 1/16	...	26/9
179,305	Stk.	Mar. 2	9½	9½	Bournemouth sliding scale ...	218—228	...	...
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	169—174	...	...
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	148—153	...	...
50,000	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	85—90	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	105—110	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
357,900	,,	Feb. 17	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6¾	6¾	Do. 5 p.c. Con. ...	155—160	...	158—159
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	144—149	...	...
855,000	,,	Mar. 2	7	8	British Ord.	158—163	...	160—162
100,000	,,	Dec. 16	7	7	Do. 7 p.c. Pref.	153—158	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—101	...	99
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...	111½
200,000	,,	,,	17/6⅝	3½	Do. 3½ p.c. Red. Deb. ...	98—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk.	Jan. 6	4½	4½	Do. 4½ p.c. Deb. ...	81—86	...	82
626,860	,,	Feb. 3	6	6	Cardiff Con. Ord.	130—135	−1	...
98,936	1	Sept. 23	2/-	2/-	Colombo, Ltd., Ord.... ...	1⅜—1⅝	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref....	20/—22/-	...	...
609,204	1	Oct. 7	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	19/6—21/6	...	...
296,053	1		1/3·30	1/3·30	Do. 8 p.c. Pref	23/6—25/6	...	...
1,775,005	Stk.	Feb, 3	5	5	Commercial Ord.	99—103	...	100—100½
620,000	,,	Dec. 2	3	3	Do. 3 p.c. Deb. ...	85—90	...	85
286,314	,,	Feb. 17	5	5	Do. 5 p.c. Deb. ...	120—125	+1	123
807,560	,,	,,	7	7	Croydon sliding scale ...	158—163	+1	160—162
644,590	,,	,,	5	5	Do. max. div.	114—119	+1	116—118½
620,385	,,	Dec. 16	5	5	Do. 5 p.c. Deb.... ...	121—126	...	...
239,000	,,	Feb. 3	5	5	East Hull Ord. 5 p.c.... ...	107—110	...	109—109¼
184,555	,,	Feb. 17	6	6	East Surrey Ord. 5 p.c. ...	130—135	...	...
176,211	,,	Dec. 16	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
19,284,128	,,	Feb. 3	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	27/3—28/3a	...	27/6—28/-
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	89—92	...	91—91¼
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	107—110	...	107½—108½
8,602,497	,,	Dec. 2	3	3	Do. 3 p.c. Con. Deb. ...	87—92	−1	88—88½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	117—120	...	118—119½
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	114—117	...	...
270,466	,,	Feb. 17	6	6	Harrogate New Cons. ...	130—135	...	...
157,500	1	Mar. 16	1/7½	1/7½	Hongkong & China, Ltd. ...	1 7/16—1 7/16*	...	...
213,200	Stk.	Mar. 2	6	6	Hornsey Con. 3½ p.c. ...	135—140	...	136
5,600,000	,,	Nov. 4	14	8	Imperial Continental Cap. ...	178—183	...	179½—182½
223,130	,,	Jan. 20	3½	3½	Do. 3½ p.c. Red. Debs.	92—97	...	...
285,242	,,	Feb. 17	8½	8½	Lea Bridge 5 p.c. Ord. ...	175—180	+3	177½
165,736	,,	Mar. 16	8	10	Maidstone 5 p.c. Cap. ...	180—190*	...	...
63,480	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	80—85	...	...
75,000	,,	Dec. 2	†10	†10	Malta & Mediterranean ...	200—210	...	...
392,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	102—107	...	...
231,978	Stk.	Feb. 17	5	5	M.S. Utility 'C' Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	...
360,075	,,	Dec. 16	4	4	Do. 4 p.c. Deb. ...	103—108	...	104
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	123—128	...	...
125,000	—	Jan. 2	3½	3½	Do. 3½ p.c. Rd. Rg. Bds.	96—99	...	...
675,000	Stk.	Nov. 18	†3	†3	Montevideo, Ltd.	62—67	+2	62—67
225,000	,,	Feb. 17	7½	7½	North Middlesex 6 p.c. Con.	169—174	...	...
396,160	,,	Feb. 3	5	5	Northampton 5 p.c. max. ...	108—113	...	...
300,000	,,	Nov. 4	†7	†9	Oriental, Ltd....	167—172	...	...
416,617	,,	Dec. 16	8	8	Plymouth & Stonehouse 5 p.c.	166—171	...	...
504,416	,,	Feb. 3	8½	8½	Portsm'th Con. Stk. 4 p.c. Std.	170—175	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	108—113	...	...
114,000	,,	Feb. 3	5	5	Preston 5 p.c. Pref.	110—115	...	...
321,961	1	Sept. 23	...	1/-	Severn Val. Gas Cor. Ld. Ord.	22/—23/-	...	...
319,510	1	Mar. 16	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	21/6—22/6*	...	...
133,201	Stk.	Feb. 17	8½	5	Shrewsbury 5 p.c. Ord. ...	147—152	...	...
90,000	10	May 27	†3	†3½	South African...	3—4	...	...
1,061,779	1	Sept. 23	1/2½	1/2½	South East'n Gas Cn. Ld. Ord.	27/—29 -	...	27/9
845,016	1	Mar. 16	-/10⅛	-/10½	Do. 4½ p.c. Red. Cum. Pref.	21/—23 -*	...	...
200,000	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	20 9—21/9*	...	21 6
450,000	Stk.	Feb. 17	4	4	Do. 4 p.c. Red. Deb. ...	101—104	...	...
6,709,895	,,	Feb. 3	5	6½	South Met. Ord.	120—123	−1	119½—122½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf....	147—152	...	150
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf....	104—107	+½	105½—105½
1,895,445	,,	Dec. 16	3	3	Do. 3 p.c. Deb. ...	88—91	...	88½—89½
1,000,000	,,	Jan. 6	5	5	Do. 5 p.c. Red. Deb.	114—117	...	...
1,543,795	,,	Feb. 3	6	6	South Suburban Ord. 5 p.c....	130—135	...	132—134
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	122—127	...	122½
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	103—108	...	105½—107
888,587	,,	Dec. 16	5	5	Do. 5 p.c. Deb....	123—128	...	124
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	104—109	...	...
415,907	,,	Dec. 2	...	4	S. Western Gas & Water Ord.	23/—24/-	...	...
160,523	,,	Oct. 21	...	...	Do. 4½% Red. Cum. Pref.	22/—23/-	...	...
110,000	,,	Dec. 16	4	4	Do. 4½% Red. Deb. ...	98—103	...	...
647,740	,,	Feb. 3	5	5	Southampt'n Ord. 5 p.c. max.	113—118	...	...
121,275	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	98—103	...	...
350,000	,,	Feb. 3	5½	5½	Swansea 5½ p.c. Red. Pref. ...	111—116	...	...
106,000	,,	Dec. 16	6½	6½	Do. 6½ p.c. Red. Deb. ...	96—101	...	...
94,000	,,	...	...	...	Do. 3½ p.c. Red. Deb. ...	96—101	...	...
1,076,490	,,	Feb. 17	6½	6½	Tottenham and Districts Ord.	149—154	...	152½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	130—135	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	...
371,850	,,	Dec. 2	4	4	Do. 4 p.c. Deb. ...	103—108	...	106—106½
369,774	,,	Feb. 3	7	7	Uxbridge, &c., 5 p.c. ...	153—158	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	...
1,340,521	,,	Feb. 3	7	7	Wandsworth Consolidated ...	158—163	...	159—162
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	122—127	...	...
1,317,964	,,	Dec. 16	5	5	Do. 5 p.c. Deb. ...	123—128	...	...
338,300	,,	,,	4	4	Do. 4 p.c. Deb. ...	104—109	...	...
499,735	,,	Feb. 17	6¾	7¼	Watford and St. Albans Ord.	155—160	...	157—157½
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	133—138	...	...
200,000	,,	Dec. 2	4	4	Do. 4 p.c. Red. Deb.	100—105	...	...
100,000	,,	,,	...	3½	Do. 3½ p.c. Red. Deb.	96—101	...	...
158,400	,,	Mar. 2	5	6b	Winchester W. & G. 5 p.c. Con.	112—117	...	...

a.—The quotation is per £1 of Stock. b.—Paid £3, including 10s. on account of back dividends. * Ex div.
† Paid free of income-tax. ‡ For year. § Actual for three months.

Stock and Share List continued overleaf.

Service

The value of your Sales and Service men is gauged by the knowledge they possess of matters pertaining to the Industry they serve. The more knowledge they possess the greater the assistance they can be towards building up an efficient and successful organization.

At little cost, the "GAS SALESMAN" (published monthly) offers a ready means to this end. As the only separate publication devoted exclusively to the sales and service side of the Industry, it has an individuality of its own and keeps its readers abreast of the times.

Do all your sales and service men regularly receive a copy of each month's issue?

Specimen copies will gladly be supplied on request.

The annual subscription is 6s.

All communications to Walter King, Limited, The "GAS SALESMAN" Offices, 11, Bolt Court, Fleet Street, London, E.C. 4.

STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Mar. 27.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 3	5	6	Bath Cons.	124—126	...	...
1,667,250	,,	Feb. 17	5	5	Bristol, 5 p.c. max.	119—121	...	...
120,420	,,	Dec. 16	4	4	Do. 1st 4 p.c. Deb. ...	103—105	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	103—105	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	125—128	...	...
274,000	,,	Feb. 17	5	5	Newport (Mon.) 5 p.c. max....	111—116	...	...
13,200	12	Mar. 16	7	8½	Pontyp'l Gas & W. 10 p.c. 'A.'	14—15*	...	...
13,600	10	,,	5	6	Do. 7 p.c. B.'	11½—12*	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C.'	11½—12*	...	...
140,778	Stk.	Feb. 17	5	5	Weston-super-Mare Cons. ...	113—115	...	...
64,338	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	98—100	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	165—169	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 3	5	6½	Chester 5 p.c. Ord.	107½—112½	...	...
92,500	,,	Dec. 16	4	4	Do. 4 p.c. Pref.	100—105	...	...
32,540	,,	,,	3½	3½	Do. 3½ p.c. Deb. ...	91—96	...	...
41,890	,,	,,	4	4½	Do. 4 p.c. Red. Deb. ...	100—105	...	...
2,167,410	,,	Feb. 17	6	6	Liverpool 5 p.c. Ord. ...	134—136	+1	...
245,800	,,	Dec. 16	5	5	Do. 5 p.c. Red. Pref. ...	103—108	...	...
306,083	,,	Jan. 6	4	4	Do. 4 p.c. Deb. ...	105—107	...	...
106,280	,,	Feb. 3	10	10	Preston 'A' 10 p.c. ...	202—212	...	...
189,219	,,	,,	7	7¼	Do. 'B' 7 p.c.	140—150	...	...
NEWCASTLE EXCHANGE.								
123,877	Stk.	Mar. 2	8	8	Blyth 5 p.c. Ord.	148—150	...	...
732,000	,,	Feb. 3	5	5	Hartlepool G. & W. Cn. & New	122—124	...	...
2,061,315	,,	Feb. 3	5	5½	Newcastle & Gateshead Con.	24 9—25 3a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	106½—107½	...	...
776,706	,,	Dec. 16	3½	3½	Do. 3½ p.c. Deb. ...	100½—101½	...	...
277,285	,,	Oct. 21	5	5	Do. 5 p.c. Deb. '43...	105—106	...	...
209,820	,,	Mar. 2	8½	8½	South Shields Con.	171—173	+1	...
299,542	,,	Feb. 3	6	6	Sunderland 6 p.c. max. ...	129—131	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Feb. 17	7	10	Derby Con.	175—185	...	...
55,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	150—160	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	130—140	...	...
20,000	10	Dec 16	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Feb. 17	10	10	Great Grimsby 'A' Ord. ...	220—230	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	220—230	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—215	...	...
1,806,339	,,	Feb. 17	6	6	Sheffield Cons.	144—147	...	...
95,000	,,	Dec. 16	4	4	Do. 4 p.c. Deb.... ...	100½—102½	...	...

a The quotation is per £1 of Stock.

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	...	...	...	Ascot Ord.	119—124	...	...
128,182	,,	...	...	...	Do. 5 p.c. Pref.	117—122	...	...
90,000	1	Nov. 4	5	5	Assd. Gas and Water Ord....	21/—23/-	...	22/3
90,000	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	22/—23/-	...	...
17,000	Stk	Feb. 17	8	8	Bognor Orig. Ord. 'A' ...	162—172	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	162—172	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	140—145	...	...
37,440	,,	Feb. 3	10	10	Cam.Univ. & Town 10 p.c.max.	210—220	...	...
125,970	,,	,,	7	7¼	Do. 7 p.c. max.	158—163	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	108—113	...	...
65,000	,,	Mar. 2	7½	8½	Eastbourne 'A' 5 p.c. ...	160—165	...	...
198,000	,,	,,	6	7	Do. '8' 3½ p.c.	133—138	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	120—125	...	120—121
130,000	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	122—127	...	...
250,000	1	Nov. 18	...	4	Gas Consolidation Ord. ...	20 6—22 6	...	...
250,000	1	,,	...	4	Do. 4 p.c. Red. Cum. Pref.	19/6—20/6	...	19/9—19/10½
117,251	Stk.	Sept. 23	8⅛	8⅛	Gosport District Cons. ...	...	...	...
73,350	,,	,,	5	5	Do. 5 p.c. Pref.	...	...	...
24,000	30	Feb. 3	8½	8½	Great Yarmouth 8½ p.c. max.	52—57	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.... ...	42—45	...	...
51,160	Stk.	Dec. 2	5½	5½	Do. 5½ p.c. Deb.... ...	123—128	...	...
152,600	,,	Mar. 2	8	8	Guildford Cons.	185—195	+15½	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	114—119	...	...
68,250	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	120—125	...	...
156,600	,,	Feb. 3	7½	7½	Hampton Court Cons. ...	167—177	...	...
81,660	10	Feb 4,'35	5	9	Leatherhead Ord.	16—17	...	...
107,960	10	Mar. 16	4	5½	Mid Kent Ord.	9½—10½*	...	...
230,940	Stk.	Feb. 17	10	10	Oxford & District Ord. ...	205—215	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	118—123	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	113—118	...	...
126,193	,,	Nov. 18	7½	7½	Peterborough Ord.	160—170	...	...
64,990	,,	Mar. 16	7½	7½	Redditch Ord.	113—118*	...	...
166,850	,,	Feb. 17	7	9	Romford Ord.	167—172	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 16	5	5	Do. 5 p.c. Deb.	120—125*	...	...
10,950	,,	Mar. 2	8	8	Ryde Ord.	165—170	...	...
136,191	,,	Feb. 3	5	7	Scarborough Ord.	128—138	...	...
27,825	,,	Feb. 3	8	8	Shanklin & Ventnor Cons. ...	152—162	...	...
40,643	,,	Mar. 2	7	7	Slough Ord.	147—152	...	...
221,000	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	116—121	...	...
28,872	1	Nov. 4	5½	5½	S. Midland Gas Cpn.Ltd. Ord.	20/—22/-	...	...
28,866	1	Mar. 16	4½	4½	Do. 4½ p.c. Red. Cum Pref.	19/6—21/6*	...	...
137,730	Stk.	Feb. 17	7	7	Southgate & Dist. 7 p.c. max.	148—153	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	115—120	...	...
117,228	,,	Mar. 2	5	6	Swindon Cons.	111—116	...	...
60,425	,,	Dec. 16	5	5	Do. 5 p.c. Deb.	122—127	...	126
50,000	1	...	...	...	Utd. Kingdom Gas Cpn. Ord.	1/6—1/9	...	21/6
760,910	1	Nov. 18	...	2½	Do. 4½ p.c. Prefd. Ord....	20/—22/-	...	...
110,910	1	,,	...	2½	Do. 4½ p.c. Cum. Pref. ...	20 6—22 6	...	...
900,000	Stk.	Mar. 16	...	3½	Do. 3½ p.c. Red. Deb. ...	98—101*	...	99½—100
130,000	,,	Feb. 3	5	8	Wakefield Ord.	137—142	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	101—106	...	...
82,000	,,	Feb. 3	6	6	Weymouth Ord.	106—111	...	...
370,000	,,	Feb. 3	4	6	York Cons.	107—112	...	...
90,000	,,	Dec. 16	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...	112
133,640	,,	Feb. 3	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	127—132	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	115—120	...	...
35,000	,,	Dec. 16	5½	5½	Do. 5½ p.c. Deb.... ...	130—135	...	...

Distribution

Domestic Utilization of Gas

by

Smith and Le Fevre

A knowledge of the *principles* of gas utilization is a *sine qua non* of effective salesmanship in the Gas Industry. The aim of this book is to deal simply and logically with these principles; and with it, as a first step, the reader will in some measure be fitted to interpret the mechanism of gaseous combustion, to differentiate between good and bad apparatus and good and bad installation, and to appreciate underlying reasons for modification in design.

It has already proved of the utmost service to thousands of students in the Gas Industry, and is officially recommended by Teachers and Lecturers at many Centres.

Price ***5/6*** *post free*
or
5/- *each for 24 copies*

WALTER KING, LTD.
"Gas Journal" Offices
11, Bolt Court, Fleet Street
London, E.C. 4